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SYPHER

ACCESS TO ISOLATED COMMUNITIES

Discussion Paper

Prepared for Director of Domestic Policy

Canadian Air Transportation Administration

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EXECUTIVE SUMMARY

In 1974, the relief of isolation was identified as a government objective in the speech from the Throne. Transport Canada officials started work immediately developing policy options including infrastructure improvements and service subsidies. Following Cabinet confirmation of support for a remote access policy, work continued into 1976 and 1977. Consultations were held with other federal departments and with provinces. In the discussion paper that was forwarded to provinces, isolated communities were defined as those having a permanent population of at least 100 which cannot be reached year-round by an all weather public road or via a regular common carrier service for passengers and freight by air, rail or water. The proposal was to provide for these communities a licenseable 3000' gravel runway, a garage/passenger shelter, maintenance equipment, NDB, and weather and communications facilities. The paper suggested a federal-provincial sharing of capital costs, and possibly of O&M.

As a result of an inability to achieve a consensus with the provinces, and a growing concern with financial restraint, it was decided not to pursue a remote access program any further. In 1977 work on policy development in this area ceased.

Despite the absence of a specific policy on access to isolated areas, both the federal government and the provinces continued to improve the airports and airway infrastructure in these areas through various other programs. Of a total of 134 sites originally identified in 1975-1977 as possibly isolated, only 13 sites remain isolated by the definition. Detailed studies of all Class 3 service points (247 sites) indicate that a further 8 sites meet the definition of isolated.

One area that still appears to have a significant number of isolated communities is coastal B.C. Twenty-two sites were identified which have no road access and over 100 population or over 500 E/D passengers annually. These communities are all served by year-round float plane service which diminishes the isolation, but in many cases the facilities provided for float services are inadequate.

In air navigation facilities and services there has also been substantial progress in providing for air service to isolated areas. Problem areas remain, however, including: gaps in enroute coverage at the altitudes used by third level carriers and general aviation; a shortage of approach aids in some areas; and inadequate weather collection and dissemination in many remote areas. Although continued installations and technological advances (Loran-C, Differential Omega, AWORS) may address these problems, in the short term there will continue to be areas of inadequate coverage, particularly for aviation weather services.

In general, however, the intent of the original program concepts developed in 1975-1977 have been satisfied.

Based on the current state of progress in airstrip development, and the specific issues identified in airstrips and air navigation it is recommended that CATA adopt the following as a policy on access to isolated areas:

CATA will facilitate safe and reliable air access to isolated communities within the provinces by

(1) installing and operating the enroute navigation system as required by CATA standards.

(2) installing and operating electronic terminal navigation aids where justified by CATA standards or at locations covered by federal-provincial agreements.

(3) on request, assisting the provinces in the acquisition, installation and maintenance of terminal navaids on a cost recovery basis.

(4) on request, providing training to provinces in the selection and maintenance of electronic navaids, VASIS and airports where this does not cause undue strain on existing resources.

(5) operating directly or through contract adequate communications and weather services.

(6) contributing to airport development in special cases through the airports capital assistance program.

(7) funding the capital and maintenance costs of float plane facilities where float plane services provide the year-round transportation system to isolated communities of over 100 population.

Initial estimates of the financial implications of this policy are an incremental increase of 0-12 person-years and expenditures of $0.01M-$3.3M/year over a 5 year period.

I BACKGROUND

A. Early Initiatives

Prior to the mid-1970's, the network of transportation infrastructure and services in Canada had pushed steadily outwards into less settled areas. The provinces and the federal government had progressively added to the inventory of airports, roads and rail lines, and had assisted in the development of services through a variety of programs. Nonetheless, in 1974, the Speech from the Throne specifically mentioned the relief of isolation as a government objective.

Almost immediately following the Speech, Transport Canada officials started the development of a policy on federal transportation initiatives for remote communities. Early work defined remote communities as "all communities in Canada to which the only practical present means of access, for all or a large part of the year, is by air". By December 1974, a policy paper was circulated outlining options for remote access programs. Four options were identified:

(1) A concentration on improved transport infrastructure in remote areas, leaving quality of service to be determined by market forces.

(2) Facilities plus service subsidies on application.

(3) Facilities plus service subsidies on a planned program.

(4) The establishment of minimum standards of affordable access and the development of a program to eliminate gaps.

The policy paper recommended that infrastructure improvements and a planned program of service subsidies be undertaken, but that no minimum accessibility standard be set. It further recommended that three program options for improving remote access be submitted to Cabinet, funded to $10 million, $15 million and $20 million annually, respectively.

Also in 1974, a five year development plan for Arctic air facilities was approved, funded to $8 million/year and designed to improve facilities and navaids at all Territorial communities with no means of regular transportation other than by air and with a population of 100 or more.

Work on remote access within provincial boundaries continued into 1975. A definition of "remote" was agreed to by an interbranch committee working on the remote access issue:

"Any community would be considered remote that:

(a) has a population of more than 100.

(b) does not have year round surface access".

The figure of 100 was selected "purely to keep the number of eligible places manageable". Preliminary studies indicated that eligible communities would be North of 50° in Ontario, Quebec and the Maritimes, North of 52° in B.C. and Manitoba, and North of 55° in Saskatchewan and Alberta. Researchers involved in the project noted the difficulty in obtaining information on small northern communities, and on Class 4 air services. It appeared in 1975 that approximately 100 communities would fit the definition of remote.

In May of 1975 Cabinet re-affirmed its support for a remote access policy, but stipulated that:

(a) projects be jointly financed by the federal and provincial governments.

(b) cost-effectiveness be the criterion for selecting a particular mode.

(c) infrastructure and subsidized service would be eligible.

(d) each remote access solution be submitted to Treasury Board.

(e) Transport Canada, in consultation with other departments, develop a remote access program for Cabinet consideration.

With this mandate, TC officials continued the development of the remote access policy and by August 1976, distributed another policy paper. The additional work produced better data on remote communities. Tables 1, 2 and 3 are reprints of tables from the 1976 policy paper. Estimated program capital costs were also identified. The 1976 policy paper also proposed specific targets for improved remote access: year round access, improved regularity, minimum one service/week frequency (with subsidies to ensure this frequency if necessary), and access to unit toll service.

Table 1. Number and Population of "Remote" Communities in Canada, by Province, as of July, 1976

Province	Population 100–199	200–299	300–399	400–499	500–599	600 plus	Total No.	Total Pop.
Newfoundland	6	4	1	–	–	2	13	3774
Nova Scotia								
P.E.I.								
New Brunswick								
Quebec	3	4	1	1	2	2	13	4559
Ontario	4	8	3	–	1	1	17	4630
Manitoba	–	2	1	2	–	3	8	3891
Saskatchewan	–	–	–	1	–	–	1	493
Alberta	2	–	–	–	–	–	2	255
British Columbia	–	–	–	–	–	–	–	–
TOTAL	15	18	6	4	3	8	54	17602

Table 2. Level of Transport Service Available to "Remote" Communities, as of July, 1976

Type of Service	Seasonal Service	Year-round Service	Total
AIR SERVICE:			
(a) Charter only*	14	4	18
(b) Irregular unit toll with avg. frequency of:**			
Once/week	9	2	11
Twice/week	12	5	17
Three times/week	3	1	4
More often	2	3	3
Sub-Total	24	11	35
(c) Regular but seasonal Class 2 unit toll***	1	–	1
TOTAL	39	15	54
Of these totals, the following also have:			
SEASONAL SERVICE BY WATER	26	2	28
WINTER ROAD ACCESS	3	2	5
BOTH		3	3

* Four communities indicated as having year-round charter service are also served on a seasonal Class 3 basis. To avoid double counting, these places appear in column 2 only.

** Frequency of air service has been estimated by Transport Canada officials in each CATA region. The average hides considerable variation in frequency.

*** Community involved is Baie Johan-Beetz, P.Q., with average service frequency of three times per week.

Table 3. Medical and Educational Facilities at "Remote" Communities, as of July, 1976

Educational Facilities	Medical Facilities None	Nursing Station	Total
None	-	1	1
Grade 1 - 6	2	-	2
Grade 7 & 8	21	21	42
Grade 9 or higher	4	5	9
TOTAL	27	27	54

The 1976 paper was circulated to other interested federal departments for comments. Suggestions received from other departments included:

(1) that the remote criteria be expanded to include all communities more than 5 hours by surface transport to nearest "hub".

(2) that increased service costs such as expanded weather service coverage be recognized in the policy paper.

(3) that economic development objectives be included in the scope of the proposed program.

(4) that a mechanism for community involvement be included in the program, in that some communities may not want improved access.

(5) that expectations of equal accessibility to government services, transport services etc. are not realistic given Canada's financial capabilities.

(6) that the cost of access roads to any airstrips that are to be provided must be included in the estimates.

While the policy development and consultation programs were ongoing with respect to the Remote Access issue, existing federal programs (DREE Western Northlands program, Airports Capital Assistance program) and provincial programs continued to improve

access to many of the remote sites in question. By 1977 only 45 communities were found to be remote by the definition.

One issue which was raised on several occasions was the air emphasis of the Transport policy paper. Several of those involved in transport and other departments felt that a more balanced multi-modal approach would be preferred. Eventually, however, it was agreed that in general air service would necessarily provide the most cost-effective solution except in a very limited number of unique cases.

Following interdepartmental consultation, the policy discussion paper was circulated to the provinces for study and comment in 1977.

In that paper, isolated communities were defined as those having a permanent population of at least 100 which could not be reached the year-round by an all-weather public road or via a regular common carrier service for passengers and freight by air, rail or water. In terms of air facilities, the proposal was to provide a licensable aerodrome with a 3000-foot gravel runway, garage/ passenger shelter, maintenance equipment, non-directional beacon, and weather and communications facilities. No expenditures were planned on improvements in the enroute navigation system or on additional airport facilities such as terminal buildings, runway and approach lighting, VASIS, emergency services equipment, power, fuelling facilities, fencing, access roads or utilities. The proposal suggested that the capital costs could be shared on a basis to be negotiated. Further discussion was to take place on whether the Federal Government would provide any funding to cover O&M costs. The total capital cost for the program was estimated at $52M while annual O&M costs were expected to reach $67M (both in 1976 dollars).

Provincial reaction to the discussion paper was varied. Among the main points of contention were the definition of an isolated community, the need for a flexible policy based on bilateral agreements designed to meet the particular individual provincial circumstances, the level of the air facilities to be provided, and finally the matter of sharing of the O&M expenditures. The Provinces generally considered the program too limited. Specific points raised by the provinces included:

(1) Some provinces do not subscribe to the federal premise that there is an obligation "to ensure that Canadians have reasonable access to transportation services, wherever they have chosen to live".

(2) The limit of 100 people in the definition of remote should apply to a catchment area, not just a community.

(3) Rather than have a cut-off at a specific community size, an annual program funding level should be established and all isolated communities would be eligible starting from the top of the list.

(4) The program should include service subsidies and contributions to O&M.

(5) Any program for airport facilities development will discriminate against those provinces that have implemented their own de-isolation programs.

(6) Where airstrips are constructed to serve treaty Indians, isn't the entire responsibility federal?

(7) The proposed construction standards and targetted levels of service may be too rich for provinces and communities.

(8) An alternative definition of isolated was proposed:

"An isolated community is an identifiable community or catchment area with a population of at least 100 which cannot be reached by those means determined by the provincial governments as reliable all weather surface access for both passenger and freight traffic by common carrier and where surface passenger access to the nearest regional surface service centre takes longer than two hours, or other communities agreed upon as being isolated by the provincial and federal governments."

(9) A measure of ton-miles of annual goods resupply from the nearest base centre is a good measure of remoteness.

(10) A 3500' x 100' runway should be the standard installation.

(11) Navaids should be included in the program where it is likely that class 2 or 3 service will be offered.

(12) Provinces that have had extensive capital programs of their own are more concerned about O&M, particularly for sites on Indian reserves.

B. Changing Times

At the same time that the provinces were arguing that the proposed policy and program was too limited, it was becoming apparent that it might also be incompatible with the fiscal restraint which was being imposed on Transport programs. As a result of the inability

to obtain agreement on a policy for remote access, and the changed financial environment, Transport Canada in April 1978 recommended to the Minister that policy development on this subject be terminated and the other departments and provinces be notified. In arriving at this decision, Transport officials concluded:

(1) That the federal government was already involved in de-isolation through a variety of programs.

(2) That the introduction of a new program would not be consistent with fiscal restraint.

(3) That remote airstrips are essentially "local works" and are properly the responsibility of the provinces.

(4) That many of the provinces already have their own programs for de-isolation under way.

(5) That such a program requires a good knowledge of local circumstances, and that only the provinces, and possibly DREE, would be in a position to plan at that level.

The Minister did not agree to terminate policy development, but agreed that further study was required before any policy could be put into place.

C. Progress in Accessibility

Inspite of the absence of a specific policy, the airport infrastructure in isolated areas has improved substantially since 1974 as a result of other federal and provincial programs.

1. Other Federal Airport Assistance Initiatives

i) The Airports Capital Assistance Program

One component of the Airports Financial Assistance policy of 1972, was capital assistance of up to 100% for community airports. As a Government policy decision, the capital assistance program was discontinued in 1978. It was however, re-opened in 1981 to provide for improvements at existing airports. Because it is directed at smaller airports, many of the airports improved under this program have been remote. Current policies, however, preclude the use of funds from this program for development of new airfields. Table 4 lists the sites for which federal assistance has been provided under this program.

Table 4. Airports Assisted under the Capital Assistance Program

PROVINCE AND MUNICIPALITY	TOTAL SPENT TO 1978
NEWFOUNDLAND	
Cartwright	46,500
Churchill Falls	-
Wabush	-
Winterland (Marystown)	135,000
Total	181,500
NEW BRUNSWICK	
Charlo	-
Chatham	61,500
Pokemouche	18,000
St-Stephen	16,586
Total	96,086
NOVA SCOTIA	
Digby	175,000
Liverpool	130,372
Margaree	50,640
Port Hawkesbury	285,680
Total	641,692
PRINCE EDWARD ISLAND	
Mount Pleasant	68,150
Total	68,150
QUEBEC	
Amos	247,308
Baie Johan Beetz	35,180
Chandler	241,095
Chevery	36,472
Chibougamau	33,139
Gaspé	210,800
Grandes-Bergeronnes	12,000

Table 4. Airports Assisted under the Capital Assistance Program (cont'd)

PROVINCE AND MUNICIPALITY	TOTAL SPENT TO 1978
QUEBEC (cont'd)	
Ivujivik	28,049
Lac Mégantic	10,878
Maniwaki	43,000
Matane	7,000
Mingan	2,650
Murdochville	194,721
Natashquan	56,270
Povungnituk	5,437
Rimouski	30,000
Rouyn	84,992
St-George de Beauce	12,461
Sorel	308,358
Thetford Mines	122,970
Victoriaville	116,091
Total	1,839,371
ONTARIO	
Atikokan	295,000
Attawapiskat	100,000
Brantford	69,606
Chapleau	140,937
Cochrane	105,828
Collingwood	111,931
Dryden	111,033
Elliott Lake	67,547
Fort Albany	35,000
Fort Frances	311,928
Geraldton	150,000
Iroquois Falls	21,696
Kincardine	35,112
Kingston	567,902
Lindsay	2,370
Midland	87,503
Sioux Lookout	82,649
Waterloo-Wellington	113,883
Total	2,409,925

Table 4. Airports Assisted under the Capital Assistance Program (cont'd)

PROVINCE AND MUNICIPALITY	TOTAL SPENT TO 1978
MANITOBA	
Brandon	27,948
Dauphin	4,971
Flin Flon	7,540
Gillam	228,712
Lynn Lake	859
Morden	145,000
Norway House	68,620
Swan River	172,010
Thompson	15,748
Total	671,408
SASKATCHEWAN	
Assiniboia	100,000
Estevan	40,000
Eston	65,000
Gravelbourg	99,999
Leader	100,000
Maple Creek	68,080
Meadow Lake	100,000
Melfort	48,060
Moosemin	50,000
Nipawin	75,000
Prince Albert	57,668
Rosetown	56,300
Shaunavon	28,800
Tisdale	54,801
Weyburn	53,337
Total	997,045
ALBERTA	
Bonnyville	100,019
Brooks	12,000
Camrose	90,000
Cardston	100,000
Claresholm	63,000
Consort	100,000

Table 4. Airports Assisted under the Capital Assistance Program (cont'd)

PROVINCE AND MUNICIPALITY	TOTAL SPENT TO 1978
ALBERTA (cont'd)	
Coronation	49,994
Drayton Valley	50,000
Drumheller	85,000
Edson	100,000
Fairview	90,000
Hanna	76,750
Hardisty	77,980
High Prairie	100,000
Lacombe	65,000
Medicine Hat	12,210
Oyen	80,000
Peace River	69,660
Ponoka	100,000
Provost	100,000
St-Paul	49,500
Slave Lake	100,000
Spirit River	84,256
Stettler	100,000
Taber	82,500
Three Hills	34,999
Vegreville	100,000
Vermillion	100,000
Wainwright	51,000
Westlock	100,000
Wetaskiwin	96,875
Total	2,420,747
BRITISH COLUMBIA	
Alert Bay	64,997
Anahim Lake	58,879
Bella Coola	488,102
Burns Lake	175,000
Chetwynd	58,000
Gibson-Sechelt	104,715
Golden	61,175
Grand Forks	18,042
Invermere	108,663
Kaslo	1,339

Table 4. Airports Assisted under the Capital Assistance Program (cont'd)

PROVINCE AND MUNICIPALITY	TOTAL SPENT TO 1978
BRITISH COLUMBIA (cont'd)	
Kelowna	75,100
Mackenzie	185,000
McBride	40,000
Nakusp	144,000
Nelson	74,376
Revelstoke	34,000
Stewart	68,592
Squamish	40,000
Trail	150,000
Valemount	10,000
Total	1,960,674
YUKON	
Beaver Creek	51,229
Faro	100,000
Old Crow	12,810
Total	164,039
GRAND TOTAL	11,450,637

ii) Special Employment Initiatives Program (SEIP)

In 1982 the federal government announced a group of initiatives aimed at reducing unemployment and at providing support to sectors hard hit by the recession and high interest rates. One of the initiatives aimed at reducing unemployment concerned a $150 million program approved earlier for increased spending under existing government construction and other programs for localized employment - intensive projects. The program was titled the Special Employment Initiatives Program (SEIP). Under this program the airports listed in Table 5 below will receive approximately $4 million for improvements over a two year period.

Table 5. Airports Receiving Funds under the SEIP Program

SITE	1982/83	1983/84	Total
Chetwynd, B.C.	$ 50,000	$ 25,000	$ 75,000
Elk River Valley, B.C.	$ 451,000	$ 49,000	$ 500,000
Humboldt, Sask.	$ 100,000	--	$ 100,000
Tisdale, Sask.	--	$ 152,000	$ 152,000
Melfort, Sask.	$ 35,000	--	$ 35,000
Pembroke, Ont.	$ 50,000	$ 536,600	$ 586,000
Ste-Anne-des-Monts, Qué.	$ 200,000	$ 80,000	$ 280,000
Rimouski, Qué.	--	$ 400,000	$ 400,000
Mascouche, Qué.	$ 40,000	$ 700,000	$ 740,000
La Sarre, Qué.	--	$ 500,000	$ 500,000
Alma, Qué.	$ 400,000	--	$ 400,000
St-Georges-de-Beauce, Qué.	--	$ 155,000	$ 155,000
St-Mathieu-de-Beloeil, Qué.	--	$ 150,000	$ 150,000
TOTAL	$1,326,000	$2,747,600	$4,073,600

2. Provincial Assistance Initiatives

Most of the programs described below have emerged as provincial initiatives. There is however, in many cases, joint federal/provincial financing and/or management participation. The individual arrangements vary from province to province. The information on these programs has been obtained from the provinces and from the federal paper "An Appreciation of Provincial Involvement in Aviation - 1982".

i) British Columbia Programs

British Columbia introduced the Air Transport Assistance Program in 1978 to assist communities in developing air-strips and related infrastructure. The objectives of the program were to:

(1) assist development and enhancement of adequate scheduled air service by third level carriers.

(2) improve access to isolated areas of the province for social and economic development and emergency services.

(3) to support other socio-economic requirements of the province such as forest protection, air ambulance, resource development and tourism.

The province has taken the stance that a local interest group (municipality, district etc) must be prepared to contribute to the capital and to operate the facility. To December 31, 1982, a total of $22.3 million has been expended on airports over a five year period by the provincial government.

ii) Alberta Programs

The Alberta Government has had an extensive airport capital program underway since 1975/76. Four categories of airports have been funded:

(a) special purpose airports designed to support provincial forest fire suppression and to support local general aviation and commercial activity. These sites are typically paved 4500'-6000' with lighting and navaids for day, night and instrument flying operations. Twelve sites were developed or improved under this element of the program.

(b) Northern airports established to provide year-round air transportation for communities north of the 55th parallel with more than 100 population and without road access. Airstrips 3000' to 4000' have been developed at sites selected. Sites in this category are: Cadotte, Janvier, Ft. Vermillion, Fox Creek, Fox Lake, and Graham Lake.

(c) Community Airports intended to serve local needs, and to be locally operated. The minimum standard for these airstrips is a 3000' x 75' runway with lighting. Over 40 sites have been constructed or upgraded to meet this standard. Appendix B contains a list of airfields developed under the community airports element of the airport program.

(d) Industrial airports, that have an aspect of economic development as well as community use. Standards similar to the community airports program have been used. More than 10 airstrips in this category have been assisted.

iii) Saskatchewan Programs

The Province of Saskatchewan has been involved in the provision of airports and navigation aids through several programs. The major ones are as follows:

(a) The Airport Assistance Program

Under this Program, all communities with populations in excess of 300 and located more than ten miles from an adequate airport are potentially eligible for assistance.

The airports in Southern Saskatchewan have been classified as Primary, Secondary and Local. Provincial contributions for the development and operation of community airports are based on sub-classifications as follows:

1) Primary - 65% up to $75,000 for development and up to $4,400 for annual operation;
2) Secondary - 50% up to $45,000 for development and up to $2,900 for annual operations;
3) Local - 100% up to $4,000 for airport development.

Minimum standards for development have been established for community airports to be eligible for these contributions. These standards include, inter alia, a hard-surfaced lighted runway 2,500 x 75 feet and, in some cases, a cross-wind runway at primary airports, and a 2,500 x 75 foot day or day/night runway at secondary airports. These airports must have adequate road access and communications. In all cases, the airport must meet Transport Canada licensing standards.

(b) Saskatchewan Northlands Agreement

Under Saskatchewan Northlands Agreement, Canada will contribute 60% and Saskatchewan 40% of the cost of approved projects to improve airports and reduce the isolation of northern communities. Airstrips have been constructed or upgraded, with priorities established on the basis of population and remoteness, at the following:

Buffalo Narrows
Camsell Portage
Cumberland House
La Loche
Patuanak
Pine House
Stoney Rapids
Wollaston Post
Ile à La Crosse

In addition to the above programs, the Department of Highways and Transportation has developed or contributed to the development of airports at Hudson Bay, Meadow Lake and Buffalo Narrows, primarily as water bomber bases. These airports are now owned and operated by the Province.

A summary of airport investment by the Department of Highways is presented in Table 6. This information does not include expenditures under the Saskatchewan Northlands Agreement.

Table 6. Saskatchewan Provincial Investment in Airports

CAPITAL
(Expenditures in 000's)

YEAR	AIRPORT	NAVIGATION AIDS	OPERATIONS
74/75	546	-	26
75/76	1,074	-	42
76/77	2,967	5	106
77/78	2,058	-	174
78/79	991	-	237
79/80	1,309	-	260
80/81	2,112	-	342
81/82	774	-	342

iv) Manitoba Programs

The Province of Manitoba has been involved for a number of years in airport development and in the provision of navigation aids throughout the Province. It owns and operates 30 airports (two are presently closed) with additional responsibilities for the administration of leases concerning the licensed airports at Lac du Bonnet and Grace Lake. Table 7 is a list of those airports owned by Province.

Table 7. Airports Owned by the Province of Manitoba

Ilford	Split Lake (closed)
Cormorant	Poplar River
Anama Bay	Moose Lake
Bissett	St. Theresa Point
Matheson Island	Lac Brochet
Thicket Portage	Berens River
Easterville	Cross Lake
Waasagomach (Island Lake)	God's Lake Narrows
Pikwitonei	Oxford House
Brochet	Little Grand Rapids
South Indian Lake	Red Sucker Lake
Pukatawagan	Island Lake
Shamattawa	Norway House
York Landing	Nelson House (closed)
Bloodvein	Gimli Industrial Park

The vehicle of provincial support for airport programs takes the form of three assistance programs:

(a) Southern Manitoba Assistance Program

Under this Program, financial assistance is available to aid communities not receiving Class 2 or 3 commercial air service to upgrade their facilities. Airports are developed to meet all Transport Canada zoning requirements and to be licensed for public use. The minimum standard which will be approved under this Program includes at least one 2000' x 75' runway licensed for day VFR flying, which can be expanded to a 2500' x 100' runway licensed for night VFR flying.

Funds are made available to Municipal Airport Commissions for airport construction through grants and loans. These funds are to cover the direct costs of construction, extension, upgrading and improvements, including land acquisition, for airports in Southern Manitoba. In addition to the capital construction portion of this Program, funds are available through grants for the operation and maintenance of airports licensed by Transport Canada.

(b) Northern Manitoba Airport Assistance Program

The intent of this program is to assist in the development of licensable airports at those northern Manitoba communities which are ineligible for assistance from Transport Canada or from other

Provincial government programs. Provisions include funding for improving an airport which is safe and which will meet all Transport Canada licensing standards for a minimum 2500' runway, with night VFR flying. The program also provides grants for annual operation and maintenance of these airports. The communities which qualify under this program are Wabowden, Snow Lake, Leaf Rapids and Grand Rapids. Leaf Rapids is the only airport receiving assistance at the present time.

(c) Northern Airport Development Program

The objective of this program is to operate and maintain airports in remote and isolated communities in Northern Manitoba having a population of over 100 people and having no other reliable year-round transportation access. Under this program, the intent is to construct or upgrade these community airstrips to Class D aerodrome standard and to provide the necessary capital equipment to maintain them.

The program also provides for the installation of basic air navigational equipment to improve reliability of use. Airstrips have been developed or are under development at:

Waasagomach
Poplar River
God's River
Tadoule Lake
Granville Lake

Upgrading has taken place at:

Lac Brochet
Pikwitonei
Thicket Portage
Ilford
Red Sucker Lake
St. Theresa Point
Berens River
Bloodvein
Oxford House
Little Grand Rapids
Norway House

The program was implemented by the Province and cost shared with the Department of Regional Economic Expansion.

The Government of Manitoba has also been involved in the installation of navigational aids in the northern part of the Province. A total of eleven low power non-directional beacons (NDBs) having a range of 25 to 30 miles have been installed at aerodromes owned by the Province.

Table 8 provides an overview of provincial investment in airports and navigational aids over the past five years.

Table 8. Manitoba Provincial Investment in Airports and Navigational Aids

CAPITAL
(Expenditures in $ 000's)

YEAR	AIRPORTS	NAVIGATION	OPERATIONS
75/76	1,647.0	23.0	825.0
76/77	4,370.5	11.0	1,292.0
77/78	1,539.0	33.0	1,284.0
78/79	125.0	10.0	1,113.0
79/80	203.2	NIL	1,734.0
80/81	601.8	NIL	2,108.0

v) Ontario Provincial Programs

Ontario has had two airport programs in place for a number of years:

(a) Northern Airports. To relieve isolation in the Northern areas of the province, Ontario has constructed or upgraded 18 sites. At 6 of these sites private NDB's have been installed. The list of sites included in this program is almost identical to the original Transport Canada 1975 list of sites needing development, so that today 18 of the 19 Ontario sites identified as potentially isolated in 1975, have 3500' or longer gravel or asphalt airstrips. Several other northern strips have been developed or improved to 3500' or longer, including Pickle Lake, Armstrong, Deer Lake, Pikangikum and Kashechewan. In developing these Northern sites, Ontario has established a priority system based on population times distance from regular public transportation of any mode; communities with the highest numbers have been provided with facilities first.

Many of these remote sites have been provided for Indian communities and have been developed on Indian Reservations. By siting the airstrip in consultation with the communities and by using local labour, the Province has minimized problems caused by the construction of airstrips on Indian land.

(b) Community Airports. Ontario also subsidizes municipal airports in less remote areas. Over 50

sites are eligible for assistance, and the ultimate objective is to provide for an airport every 25 miles in the populated areas.

For some time Ontario has been withdrawing from the provision of electronic navaids. To this end it signed an agreement with Transport Canada in 1979 indicating that the province would accept the responsibility for northern and community airstrips, if Transport would install and maintain the navigation aids.

vi) Quebec Programs

In the past several years the Province of Quebec through its Ministry of Transport has become actively involved in air transportation issues. The Province currently owns twelve airports (Table 9) some of which are operated by it while others are operated and maintained by local municipalities.

The Province has also assumed responsibility for the operation and maintenance of Lac-des-Loups and Casey which are Transport Canada sites.

Table 9. Airports Owned by the Province of Quebec

Bonaventure
Fort Georges
Gatineau/Hull (owned and operated by the Outaouais Development Corporation)
St-Augustin
Matagami
Mingan
Montmagny
Post-de-la-Baleine
Ile-aux-Grues
Ile d'Entrée
St-Honoré de Chicoutimi
Port Menier (Ile d'Anticosti)

Provincial expenditures on airports have been steadily increasing over the past 7 years and now total approximately $13.7 million. Provincial involvement has included the provision of air navigation facilities and air terminal facilities. Table 10 is a list of capital projects financed by Transports Quebec in fiscal year 1980-81. The table does not take into account the expenditures of Hydro-Quebec's Société d'Énergie de la Baie James in constructing various airports required for the hydro-electric development of the James Bay area e.g. La Grande, Caniapiscau etc.

Table 10. List of Transports Quebec Airports Projects Fiscal Year 1980/81 - 000's $)

- Chibougamau-Chapais	construction of new airport	$1,657,400[1]
- Montmagny	moving of a radio tower	$ 127,000[2]
- Montmagny	expropriation of lands	$ 42,000
- St-Honoré	purchase of fire intervention vehicle and start of runway lighting project	$ 96,000
- Bonaventure	completion of ATB plus tree clearing for approach lights	$ 32,000
- Port Menier	stabilization of runways	$ 25,000
- Matagami	rotating beacon	$ 12,000
various small projects		$ 66,000
TOTAL		$2,057,400

[1] 50% of this cost is reimbursed by Transport Canada in accordance with Federal-Provincial agreement.

[2] The Province is requesting a Transport Canada contribution of $65,000.

Most of the capital expenditures made by the provincial government have been on an "ad hoc" basis without the benefit of an articulated provincial policy or formal intergovernmental agreement.

In addition to nationally applicable programs, the federal government is making a substantial contribution to airport development in the Province of Quebec through specific Quebec programs. The major programs and the airports affected are outlined below.

(a) LaPrade Nuclear Fund

In December 1978, the federal Cabinet decided to cease work on the partially completed LaPrade heavy water plant. In 1982 the Minister of Energy, Mines and Resources obtained Cabinet approval to fund two projects totalling up to $10.5 million from an initial allocation of $50 million. Later that year the LaPrade fund was identified as a possible contributor within the LaPrade region to reinforce the Quebec Regional Fund's job creation objectives. Consequently, LaPrade funds have been released to implement various projects at Quebec airports (Table 11).

Table 11. Quebec Airports Receiving Funds under the La Prade Program

AIRPORT	EXPENDITURE	IMPROVEMENT
Louiseville	$ 300,000	Runway and taxiway paving
Drummondville	$4,300,000	ATB, runway extension lighting, NDB, VASIS
La Tuque	$ 230,000	Installation of perimeter fencing, apron construction, fuelling facilities expansion, renovation of ATB, carpark, landscaping
Sorel	$ 150,000	Completion of runway paving, taxiways and apron
Lac à la Tortue	$ 65,000	Runway lighting
Victoriaville	$ 100,000	Runway lighting
Parent	$ 125,000	Airport lighting, bush clearing
TOTAL	$5,260,000	

(b) Northern Quebec Development Program

This program is a joint Federal/Provincial venture for the development of an air transportation infrastructure in northern Quebec. It involves a 10 year program commencing in 1983/84 with a total capital cost of $101 million. The proposed program is for airport construction, navaids and access roads for 14 isolated villages - 11 Inuit and 3 Cree. The site names and locations are illustrated in Figure 1. The negotiated Federal/Provincial breakdown of responsibility for ownership and O&M is as follows:

Navaids - Transport Canada
Cree Airports - Transport Canada
Inuit Airports - Quebec

Figure 1. Sites Included in Northern Quebec Development Program

vii) Newfoundland and Labrador

The Province of Newfoundland is actively involved in the subsidization of air operations to isolated areas, particularly along the Labrador coast. This involvement has taken many forms but the two largest programs are the financing of the operating deficit of Labrador Airways Ltd. for services provided to isolated communities on the Labrador coast and the 25% air passenger subsidy to residents of Labrador who travel to the island of Newfoundland.

These two programs accounted for roughly 80% of the $610,000 provided by the province in the way of an air operations subsidy in 1978. The remaining 20% was provided to support winter food airlifts during winter freeze-up and emergency situations.

While the Province does not have a comprehensive policy for airport or air navigation aid development, it does maintain on-going programs for improvements to facilities and installation of aids. With respect to airports and air navigation aids, the Province has provided the following facilities at the sites below:

Bonavista - airstrip and lighting, O&M
Port aux Choix - airstrips and lighting, O&M
Springdale - airstrips and lighting, O&M
Winterland - airstrips and lighting, O&M
Cartwright - airstrips and (possibly) lighting, O&M
Bell Island - runway upgrading and paving, O&M
Forteau/Lanse au Loup - airstrip construction
Red Bay - airstrip improvements

Commencing in December 1979, with Port aux Choix, tenders were called to upgrade the runway lighting systems at all airstrips operated by the Province in Newfoundland.

In 1976, the Province undertook a program of constructing helicopter landing pads at selected south coast communities and in centres where a designated landing area was required in the interests of safety and control. Seven helipads have been constructed to date at such points as Burgeo, McCallum, Gaultois, Harbour Breton, Grand Falls, Paddy's Pond (St. John's), Springdale, and Grey River.

CATA's Labrador Area Master Plan, completed in 1975 and updated in 1980, recommended that airstrips be built at 14 Labrador communities (Figure 2). To date, Transport Canada has constructed airstrips at Nain, Makkovik, and Mary's Harbour, and construction of one at Davis Inlet is underway. An airstrip at Cartwright has been constructed by the Province with the assistance of a small federal grant.

By virtue of the Federal/Provincial Labrador Airstrips Umbrella Agreement, signed in July, 1982, Canada has agreed to construct up to nine further airstrips, now scheduled to be operational by 1987/88, to serve the communities of Postville, Rigolet, Port Hope Simpson, Charlottetown, Black Tickle, Paradise River, Fox Harbour, and possibly Red Bay and Hopedale. The total cost of this program has been estimated at $48 million for the 14 sites.

While the Province is assuming responsibility for operating and maintaining the airstrips and the low-power non-directional beacons (NDB), the federal government has agreed to restore the airstrips and certain equipment, and to maintain and operate the high-power NDBs along coastal Labrador. As well the Cartwright airstrip will benefit from improvements to the program of airstrips negotiated in the Umbrella Agreement. Insofar as Hopedale and Red Bay are concerned, the federal government and the Province are reassessing the need for airstrips to serve these communities.

Figure 2. Coastal Labrador Sites

3. Summary

Many communities that were identified as isolated in the mid-1970's, now have the facilities to provide for year-round air access. Appendix A is the original 1975 list of over 106 sites identified as possibly being isolated. Appendix B contains 28 additional sites not included in the 1975 listing but included in a 1977 list of 66 remote sites. The current status of airstrips at these sites is shown in the appendices. Of the total of 134 sites listed (all potentially eligible sites regardless of population size) 90 now have or shortly will have airstrips of 3000' x 75' or greater, 6 are being developed under existing programs, 7 have year-round water aerodromes with public carrier service, an additional 13 have airstrips 2000'-3000', 5 have surface access, and 7 have populations of less than 100. Table 12 summarizes the remaining sites by province. Of the 13 sites which still meet the original definition of isolation 6 are in Quebec.

In addition to supplying infrastructure for the original sites listed in early federal studies, the various federal and provincial programs have developed airstrips and associated services at a variety of small communities in the Northern areas of the provinces that weren't originally listed. Appendix C lists sites assisted under various federal and provincial programs since 1975.

Table 12. Sites Listed in 1975 or 1977 as Remote Which Will Still Be Remote by Definition When Current Federal/ Provincial Programs Are Complete

PROVINCE/SITE	STATUS	POPULATION (1981)	ACCESS
QUEBEC			
Baie Johan-Beetz	No airstrip	150	-
Gethsémani	No airstrip	- **	-
La Tabatière	No airstrip	433	-
Harrington Harbour	No airstrip	679*	-
Deception Bay	No airstrip	-	-
Manouane Reserve	No airstrip	960	-

* 1976 Census data

** No Census data available but level of unit toll traffic indicate that population is probably greater than 100.

Table 12. Sites Listed in 1975 or 1977 as Remote Which Will Still Be Remote by Definition When Current Federal/ Provincial Programs Are Complete (cont'd)

PROVINCE/SITE	STATUS	POPULATION (1981)	ACCESS
ONTARIO			
Angling Lake	No airstrip	194	-
Kingfisher Lake	No airstrip	255	-
North Spirit Lake	No airstrip	166*	-
Poplar Hill	No airstrip	131	-
Wunnumin Lake	No airstrip	362	-
Pauingassi	No airstrip	222*	-
SASKATCHEWAN			
Deschambault Lake	No airstrip	372*	-

* 1976 Census data

To further examine the possibility that there could be additional communities that meet the definition of isolated that were not identified in earlier studies, a complete listing of all Class 3 service points was prepared. From this listing all sites identified in earlier studies were removed, and all larger centres were removed. On the assumption that Class 3 services would prevail where there was either insufficient traffic or inadequate facilities to support a scheduled service, the facilities, populations and access modes for each of the remaining Class 3 service points were identified (Appendix D). From a listing of 247 sites, 8 meet the definition of isolated adopted in 1977. Table 13 lists these sites.

Table 13. Additional Class 3 Service Points Which Are Isolated by Definition

PROVINCE/SITE	STATUS	POPULATION (1981)	ACCESS
NEWFOUNDLAND			
Change Island	No airstrip	580	-
QUEBEC			
Kegashaka	No airstrip	152	-
ONTARIO			
Bear Island	No airstrip	139	-
Muskrat Dam	No airstrip	155	-
BRITISH COLUMBIA			
Mahatta River	Year-round water aerodrome	129	-
Manson's Landing	Year-round water aerodrome (CATA)	90	-
Port Simpson	Year-round water aerodrome (CATA)	856	-
Queen Charlotte City	Year-round water aerodrome (CATA)	727	-

In preparing Appendix D, it was clear that the Canada census figures for very small communities were unreliable in that many communities have no population identified. It was assumed that where the census showed no population, the population is very likely to be less than 100. As an alternative measure to identify communities which may be larger than 100, but for which no population was shown, all communities with more than 500 E/D unit toll passengers per year and no year-round surface access were identified. A total of 17 additional sites which may be isolated by definition were identified in this manner, all of which are water aerodromes. Table 14 summarizes.

Table 14. Class 3 Service Points (population unknown) Which Have More than 500 E/D Unit Toll Pax and No Year-round Surface Access

PROVINCE/SITE	STATUS	UNIT TOLL TRAFFIC 1980
ONTARIO		
Summer Beaver	Water aerodrome (seasonal only)	800
BRITISH COLUMBIA		
Kitsault Village	Year-round water aerodrome	15,900
Kincolith	Year-round water aerodrome	1,700
Kingcome Inlet	Year-round water aerodrome	900
Clowham Falls	Year-round water aerodrome	1,200
Daniels River	Year-round water aerodrome	600
Dinan Bay	Year-round water aerodrome	1,700
Kyoquot	Year-round water aerodrome	600
Louise Island	Year-round water aerodrome	1,300
Kilbella Bay	Year-round water aerodrome	600
Moses Inlet	Year-round water aerodrome	1,300
Phillips Arm	Year-round water aerodrome	1,300
Shoal Harbour	Year-round water aerodrome	800
Silvery River	Year-round water aerodrome	500
Toba	Year-round water aerodrome	700
Wakeman Sound	Year-round water aerodrome	1,000
Wellbore	Year-round water aerodrome	500

D. Air Navigation in Remote Areas

1. Introduction

To fully understand the significance of the status of air navigation aids, communication and weather facilities in remote areas, it is important to gain an appreciation of the fleet characteristics, capabilities and operating requirements of the aircraft serving these areas. A great deal of the commercial air services in the northern areas of provinces are provided by local and sub-regional carriers, who by the nature of their aircraft and missions must regularly fly at low altitudes, in a less hospitable environment, and often on routes ill served by navigation and communication aids. These conditions are no less of a burden to air ambulance and forest fire services who need to respond at short notice with flights to points all over remote areas of the provinces.

The majority of the aircraft operated by the sub-regional and local carriers are well suited to the short-haul, low volume routes into airports with short runways or sea plane bases which are their normal service pattern. Unfortunately, these same aircraft derive little benefit from an enroute navigation system which is principally designed to support high altitude flying.

Using British Columbia as an illustration, only about 25 percent of the aircraft leased or owned by these carriers are twin-engined and fewer than 5 percent are turbine-powered. More typical of the air carrier fleet are the De Havilland Beaver, Cessna 180's and 185's, the Grumman Goose, De Havilland Otters, Twin Otters, and DC-3s. The aircraft are usually non-pressurized and not equipped with oxygen equipment suitable for extended flight 12,500 feet above sea level (3,810 metres).

The navigation systems can be broadly divided between those which provide enroute guidance and those which provide approach and landing guidance although some are used for both purposes if they are suitably located.

2. En Route Navigational Aids

The present route structure for the navigation of air traffic is based both on navigation and air traffic control requirements and is characterized by the strategic placement of VHF Omni-Ranges (VOR) and/or Non-Directional Beacons (NDB) for the delineation of airways (controlled airspace) and air routes (uncontrolled airspace). The VOR may be co-located with either Distance Measuring Equipment (DME) or military Tactical Air Navigation equipment (TACAN). Azimuth guidance is provided by the VOR whilst distance to the VOR is provided by DME or the TACAN. NDB's utilized in the enroute system are of high power (above 100 watts).

Because the provision of navigational aids and services is dependent upon traffic, the more heavily travelled routes usually get top priority. In the northern areas of the provinces, facilities tend to be sparse and are frequently augmented by provincial or private aids or services to improve regularity and safety of service.

Low Frequency (LF) Airways

Two types of low level airways are used by aircraft operating on Instrument Flight Rules (IFR). The low frequency (LF) airway is defined by a series of non-directional beacons (NDB's) and is recognized to be based on older, less precise technology. Signal propagation from the NDB's is highly subject to weather interference and terrain distortion, and track guidance tolerances are far wider than with other aids.

Non-directional beacons (NDB's) are normally installed as the prime navigational aid along low frequency airways and air routes in Canada. Current Transport Canada criteria for installation as an enroute navigational aid require that there be a continuing average of four flights per day or sixteen flights per week, which will use the facility to obtain navigational data. Also, more than one operator must be involved in such operations and the traffic must be of a scheduled, non-scheduled or executive nature. However, where an instrument approach procedure based on the facility can be developed, the total potential usefulness of the beacon should be considered, but the "en-route" part of the requirement must be not less than a continuing average of two flights per day or ten flights per week. Statistics supporting a stated requirement for a Non-Directional Beacon to be installed as an en-route aid should cover a six month period. The existing enroute NDB coverage is shown in Figure 3.

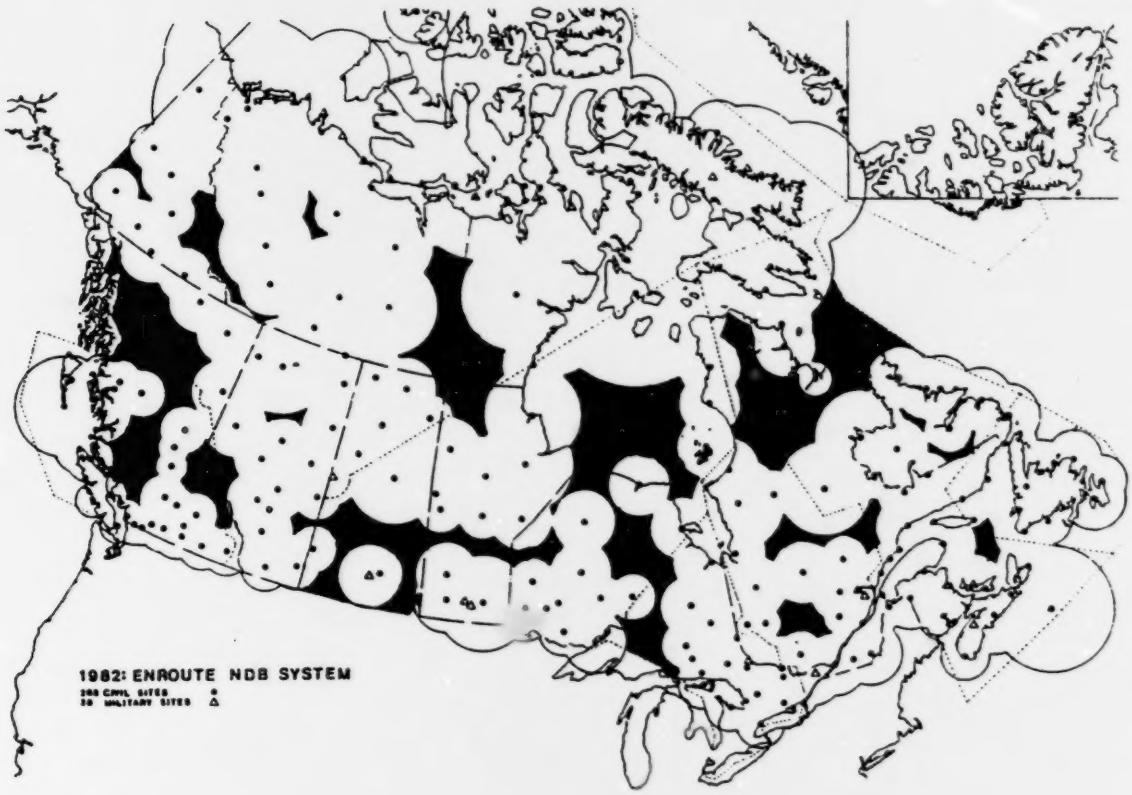

Figure 3. Enroute NDB System

In many areas of Canada, airways defined solely by low frequency aids are being phased out. For example, in Ontario only 27% of the airways remain dependent on the older NDB's. However, in B.C., partially due to the expense of setting up more remote VOR's, 48% of the airways are still low frequency only. The nautical miles of airways (5,082 m.) still defined by NDB's in B.C. is highest for all Canada. Table 15 compares nautical miles of airways by province.

Table 15. Comparison of Provinces Reliance on L.F. Airways
Nautical Miles - Airways

	BRITISH COLUMBIA	ALBERTA	SASKATCHEWAN	MANITOBA	ONTARIO	QUEBEC	NEWFOUNDLAND & LABRADOR
L.F. AIRWAYS	5,082	3,506	2,187	1,761	2,593	3,563	3,305
V.H.F. AIRWAYS	5,433	4,224	2,255	2,755	6,882	3,811	1,228
TOTAL MILES OF AIRWAY	10,515	7,825	4,442	4,516	9,475	7,374	4,533
PROPORTION OF TOTAL PROVINCIAL MILES STILL USING L.F. AIRWAYS	48%	45%	49%	39%	27%	48%	73%

Source: Based on Transport Canada Designated Airspace Handbook Issue 911

There are significant gaps in enroute public NDB coverage in B.C., Northern Ontario and Northern Quebec, and these gaps are coincident with the gaps in VOR coverage.

Transport Canada Officials have been aware of these system deficiencies for some years. The Northern Ontario Area Aviation Master Plan included a long range program to complete an adequate system, as did the B.C. Area Aviation Master Plan. The problem is not one of lack of knowledge or intent, but of lack of resources, and a need to complete installations at more heavily travelled sites first.

In many provinces, the provincial governments have stepped in to provide the minimum navaids for regular commercial service; low powered NDB's. Typically these NDB's are significantly less costly than those installed by Transport Canada, have no back-up power units, and can be used only by carriers specifically identified. Figure 4 illustrates NDB coverage of Northern Ontario with the private NDB's included. With these NDB's included the coverage of navaids for enroute purposes is virtually complete. A similar picture exists in Manitoba.

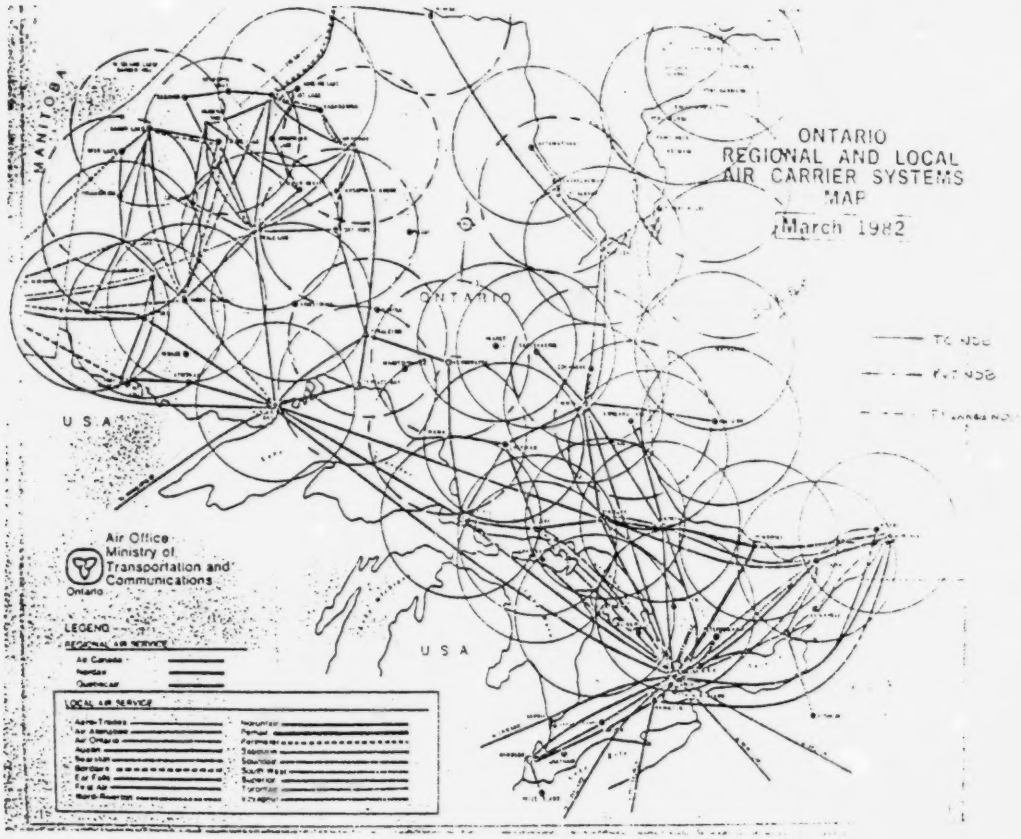

Figure 4. NDB Coverage of Northern Ontario

British Columbia presents a unique problem. Not only is the coverage of NDB's minimal, but the actual range of these navaids can be extremely limited by the mountainous terrain. Furthermore, the cost of installing and maintaining NDB's in the mountainous areas can be 10 times that in easily accessible areas. Each new navaid is therefore subject to a cost-effectiveness test that is substantially different from that used elsewhere in Canada, and few installations are approved. The scarcity of navaids, and the limited distances for communication mean that there are several areas of B.C. on major VFR flyways where there is no radio navigation or communication coverage for several hundred miles:

Alaska Hwy Ft Nelson - Watson Lake: 225 M
Rocky Mtn Trench Mackenzie - Watson Lake: 335 M
Stewart - Cassian Hwy Smithers - Watson Lake: 355 M
Eddontenajon - Whitehorse: 240 M

In effect aviation in these areas is unchanged from the 1930's. B.C. has a significantly higher rate of enroute aviation accidents than do the other provinces. The 1980 B.C. Area Aviation Master Plan recommended VOR installations at Dease Lake, Bella Bella, Kamloops, Castlegar and Cape Scott. None of these sites have yet been provided with an NDB, nor are there plans to do so before 1988 (Table 17).

Table 16. VOR Sites Programmed to 1987/88

Gaspé	Norway House
Geraldton	Coe Hill
Hearst	White Court
Natashquan	Marathon
La Tuque	Deer Lake

In the near future, development of the air navigation system in the Northern points of the provinces will continue slowly. Table 16 above showed the planned VOR installations. Table 17 illustrates the planned NDB installations. The emphasis for the installation of NDB's appears to be on the replacement of private NDB's. Figure 5 illustrates the proposed enroute NDB system in 1990-2000.

High Frequency Airways

The second set of airways in the IFR system are the Victor airways defined by a series of Very High Frequency Omni-Directional Range (VOR) installations. These facilities provide more precise course guidance and are not subject to some of the flaws encountered with NDB's thereby providing the pilot with a far more valuable tool for position fixing and enroute navigation. Due to the higher frequency in the radio spectrum,

Table 17. Planned Installations High and Low Power NDB's

SITE	PRESENT STATUS
HIGH POWER NDB's	
Bonaventure, P.Q.	Existing NDB
Berens River, Man.	
Cluff Lake, Sask.	Private NDB
God's Lake Narrows, Man.	Private NDB
Hudson Bay, Sask.	Private NDB
Island Lake, Man.	Private NDB
Leaf Rapids, Sask.	Private NDB
Meadow Lake, Sask.	Existing NDB
Nipawin, Sask.	Private NDB
Pikangikum, Ont.	Private NDB
Trout Lake, Ont.	-
White Court, Alta.	Existing NDB
Fort Severn, Ont.	Private NDB
Ground Lake	-
LOW POWER NDB's	
Postville, Lab.	-
Moosonee, Ont.	NDB/VOR
Collingwood, Ont.	-
Carp, Ont.	-
La Ronge, Sask.	NDB/VOR
Port Hope Simpson, Lab.	?
Parry Sound, Ont.	-
Pelee Island, Ont.	NDB
Terrace Bay, Ont.	Private NDB
Hornepayne, Ont.	Private NDB

* in addition to the sites listed, the Quebec and Newfoundland sites currently being developed under special federal-provincial programs include NDB installation in the scope of work.

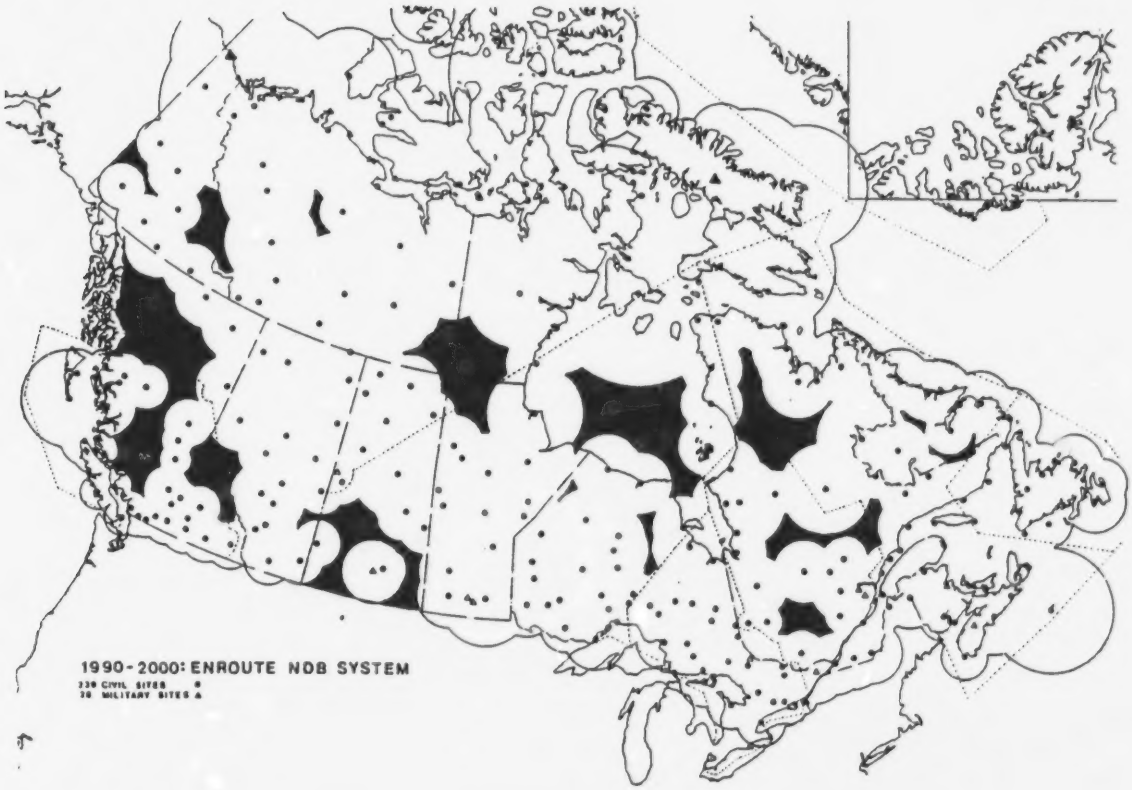

Figure 5. 1990-2000: Enroute NDB System

however, the propagation of VOR signals is generally limited to line of sight. Thus the higher the aircraft and the transmitter, the greater the range of reception. Figure 6 illustrates the 1982 VOR-DME system accessible at 18,000 feet. Nominal coverage at lower elevations was unobtainable at the time of producing this report.

Typically, the usable range of a VOR by an aircraft 1,524 m. (5000 feet) above the station is about 80 km. (50 miles). At 3,048 m. (10,000 feet) above the station signal radius grows to about 128 km. (80 miles), while at 5,486 m. (18,000 feet), the signal is usable at about a 257 km. (160 mile) range. Given that much of the flying in remote areas is done at lower elevations and that terrain effectively reduces the theoretical range of VOR's in many areas of the country, gaps in VOR coverage are inevitable. A cursory examination of the maps shows a substantial gap in VOR coverage in Northern B.C., Northern Ontario and Northern Quebec.

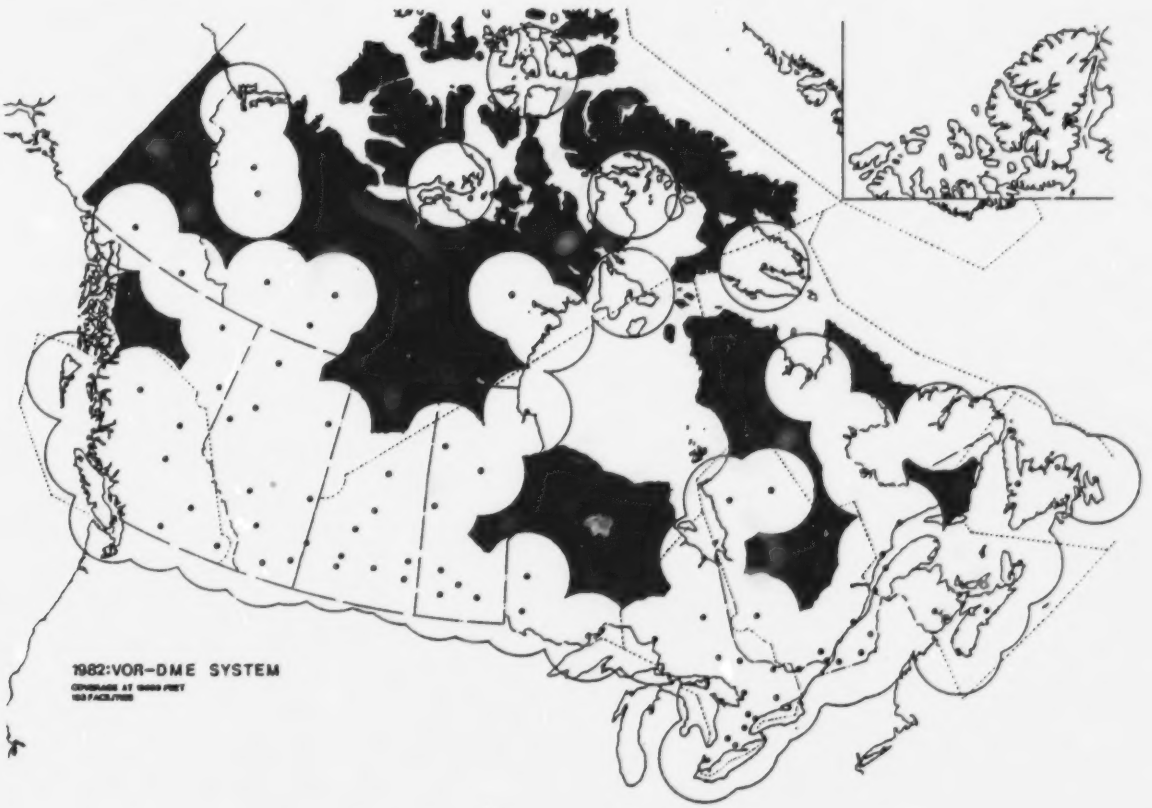

Figure 6. 1982: VOR-DME System

The present VOR stations are located such that the pilot of a high performance jet aircraft flying over 5000 meters (16,500 feet) will be receiving one or more stations on most flight routes. However, at lower altitudes, more closely spaced stations are required for a complete network. Classification and re-organization of Canadian airspace by Transport Canada will also reduce the available airspace for low level IFR flights, particularly in mountainous territory such as in British Columbia

Summary and Outlook

It is possible to calculate by computer the coverage of all navigation aids to accurately identify specific coverage gaps in the system but simply by looking at a map of air routes, it is possible to identify significant segments of Canada with no instrument navigation capability at present. For example, in

British Columbia the Yellowhead highway route, serving communities like Clearwater, Blue River, Valemount, Hinton and Edson has no airway associated with it and several other regions are devoid of airway facilities or IFR airports.

In addition to areas with no airway coverage, there are many airways which have minimum en route altitude requirements which effectively make them useless to the lower level general aviation fleet, particularly in B.C.

The immediate outlook in navigation systems development is not encouraging for remote areas. CATA plans (The Brown Book) call for the completion of a VOR/DME network which will ensure that navigational coverage is consistent with the coverage provided by surveillance radars in high density traffic areas. Outside of radar coverage in the low density traffic areas a network of DME's co-located with NDB's will provide for DME updating of airborne inertial navigation systems as well as improving navigation for aircraft flying at lower altitudes. Figure 7 shows the VOR-DME system coverage in 1990-2000 at 18,000 and 12,000 ft.

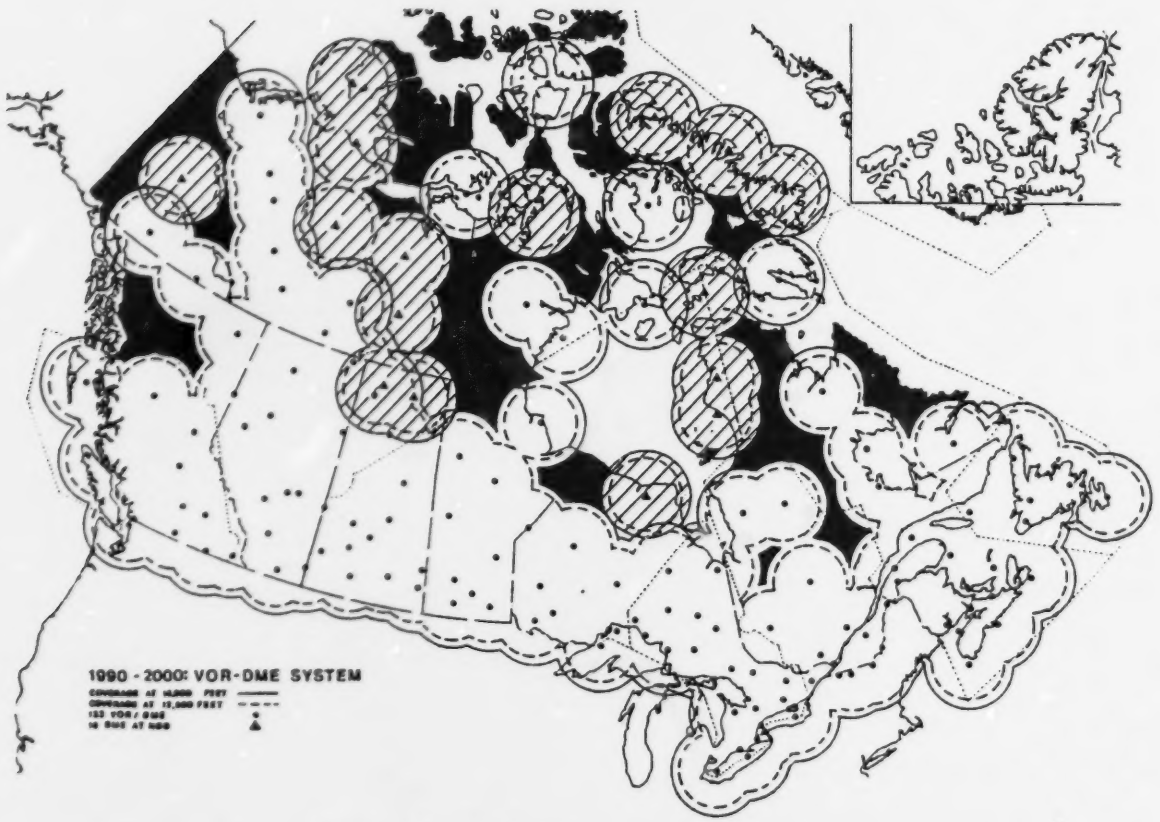

Figure 7. 1990-2000: VOR-DME System

Although Figure 7 gives the impression of substantial coverage by the year 2000, the adequacy of this coverage for the purposes of remote area navigation can only be properly assessed if VOR-DME system coverage were available below 12,000 feet.

Alternative Navigation Systems

Although in the short-term under existing plans air navigation in remote areas will not be significantly improved, there are two navigation systems being implemented worldwide which have the potential to benefit remote area navigation:

(a) LORAN-C

Loran-C is a hyperbolic radio-navigation system that uses ground waves at low frequencies to provide operating ranges of 600 nautical miles or more, up to 1,500 nautical miles independent of line-of-sight. It uses pulse techniques to avoid skywave contamination. Loran-C is capable of achieving accuracies of approximately 556 metres (0.3 NM) or better in its defined coverage area. The Loran-C system currently consists of 16 chains operating throughout the world comprising a total of 51 transmitting stations. Each chain includes one master station and from three to five secondary stations. Two-thirds of the continuous United States and Alaska is currently within the Loran-C coverage area (Figure 8) provided by 19 stations.

The Canadian Coast Guard operates two stations on the West Coast (Williams Lake and Port Hardy), will take over Cape Race in April 1983, and is building Fox Harbour on the East Coast. In Canada, Loran-C is mainly used by marine traffic.

Loran-C receivers are being manufactured for aviation use and some are now approved for enroute service in the United States. Testing and evaluations are continuing. Loran-C accuracy is sensitive to the geometry existing between the receiver and the transmitters. The current operational performance capabilities of Loran-C are summarized in Table 18.

While Loran-C is potentially an acceptable enroute area navigation system, in order to provide adequate signal coverage over the entire North American continent, the number of stations would have to be dramatically increased. The existing system however has potential with respect to several vast "remote" areas in Canada, particularly northern British Columbia, Alberta and parts of Ontario and Quebec.

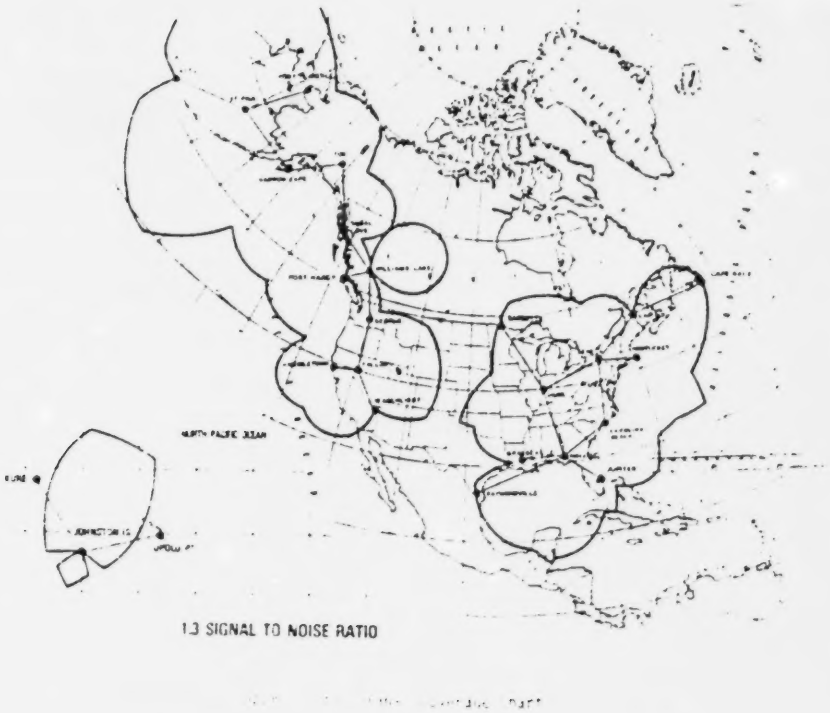

Figure 8. Approximate Loran-C Coverage Chart

Table 18. Loran-C Operational Performance Data

Flight Phase	Flight Technical Error (±NM)	System Use Accuracy (±NM)	
		Cross-Track	Along-Track
En Route	0.71	0.73	0.12
Terminal	0.58	0.60	0.15
Approach	0.28	0.32	0.16

Additionally, national and international agreements would be required before adopting Loran-C as a short distance navigational system.

(b) OMEGA[1]

The OMEGA navigation system is a VLF (10-14 KHZ), phase comparison, rho-rho or hyperbolic radionavigation system capable of use by ships, submarines, aircraft and units on land. The system has eight transmitting stations which are approximately 5000 miles apart. Position information is obtained by measuring the relative phase of received signals. The design predictable accuracy of the system is 2 to 4 NM and depends on geographic location, station pairs used, propagation corrections, and time of day. The design repeatable accuracy is 1 to 2 NM. Greater accuracies are possible through the use of fixed monitor stations to broadcast local corrections on a real-time, continuous basis, a supplement known as Differential Omega. The purpose of OMEGA is to provide an all-weather, worldwide position determination for civil and military air and marine users.

At present, the eight permanent stations required for worldwide coverage are operational. The stations are located in Norway, Liberia, North Dakota, Hawaii, La Reunion Island, Argentina, Japan and Australia.

In addition to air and marine users, some commercial and private ships and aircraft are using the OMEGA system. Certain intercontinental air carriers are using OMEGA to bound the errors of their self-contained navigation systems, and as stand-alone navigation systems.

Current information indicates that the existing permanent stations provide basic coverage over more than 90 percent of the earth's surface and virtually all of the Northern Hemisphere. The existing transmitting stations are dedicated to navigation. There is now a World-wide program to measure the coverage and accuracy of the system on a regional basis. This process includes collecting data from fixed ground monitor receiver sites to correct and update propagation models and tables, and special calibration tests to confirm propagation parameters

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[1] National Airspace Plan Phase II
Identification of Potential Airspace Development, October 1982

affecting coverage and availability. Several air carriers and States are engaged in collecting OMEGA data on air routes around the world.

The OMEGA system, while capable of providing worldwide coverage from only eight transmitting sites, is limited in accuracy. While the system design accuracy of 2 to 4 NM is satisfactory for oceanic and high seas navigation, it cannot meet the accuracy required for maritime and helicopter navigation or for aircraft flying over land in some airspace.

The primary limitation on OMEGA system accuracy is due to propagation errors. These can vary from place to place and with the time of day and season in any given place. These errors are reduced by the application of average propagation corrections which are published. These average corrections cannot account precisely for all temporal and spatial error variations. Fixed monitor stations, however can identify local errors and calculate corrections. These corrections can be broadcast to OMEGA users in the vicinity. A suitable receiver can apply them automatically as corrections to phase-difference measurements obtained from the basis signals. This augmentation of the basic system is known as differential OMEGA.

Differential OMEGA could provide navigation information for a terminal area. Experiments to date, conducted principally in France, Canada and the U.S. have investigated the degree to which this technique can improve the accuracy of an OMEGA fix, and have explored alternatives for the format of broadcasting differential corrections, radio frequency to be used for broadcasts and techniques for receiving and applying differential corrections automatically. The FAA and Canada investigated the use of Differential OMEGA as a potential navigation system, for aircraft operating in remote areas, primarily in Alaska, and Canada is continuing to work in the Ottawa Valley. Some countries are already using Differential OMEGA for coastal marine navigation.

Another characteristic of the OMEGA system is that the signals from a particular station are unusable in the immediate vicinity of that station. Notwithstanding this aspect, OMEGA has proven adequate for navigation over the North Atlantic, Northern Canada and the Caribbean. It has been installed by some Canadian air carriers and corporate aircraft owners that operate in these regions. In Northern

Domestic Airspace the future primary enroute navigation will almost certainly be OMEGA, INS, OMEGA/VLF, GPS or a combination of these. OMEGA appears to be the most promising over the short term (till 1995) and this avenue will be encouraged.

CATA plans call for the increased use of OMEGA which will be encouraged by supplementing coverage with one or two VLF stations and differential OMEGA will be installed at selected locations. Figure 9 shows a planned 26 facilities for the year 2000.

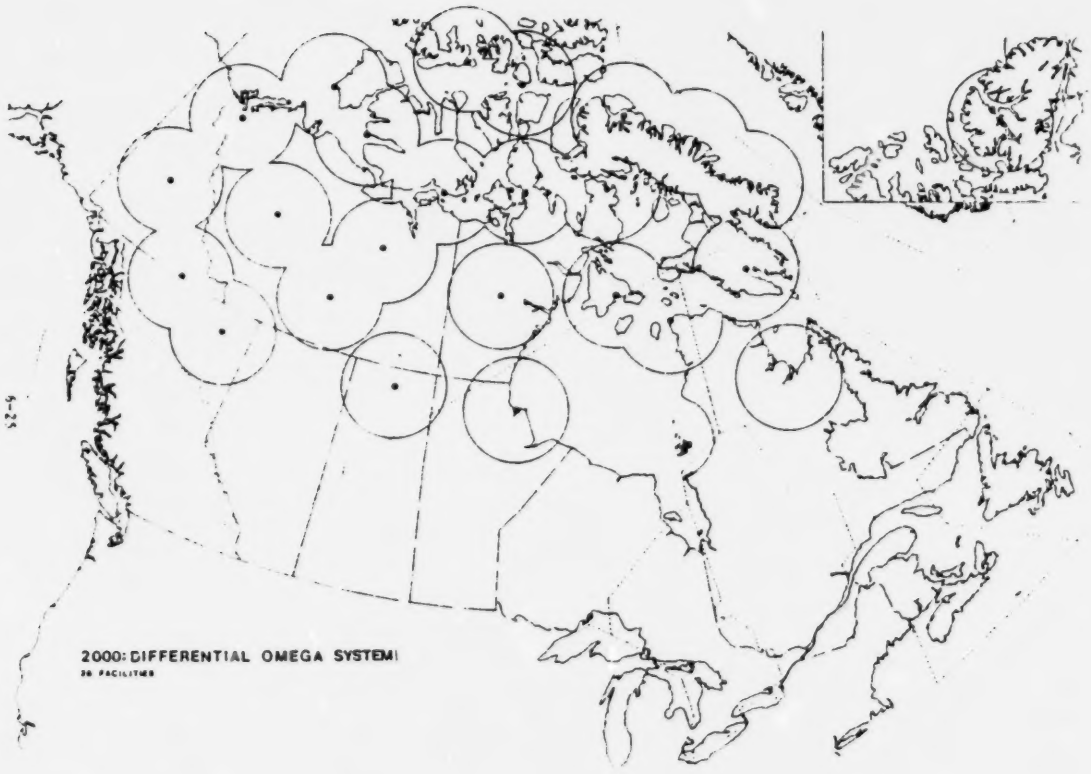

Figure 9. 2000: Differential Omega System

3. Approach and Landing Systems

Instrument and visual approach aids represent a critical component of the aviation infrastructure which, in addition to the enroute facilities, must be examined in the context of aviation's crucial role in remote areas and the special challenges presented by terrain and extremes of weather in the northern areas of the provinces.

The present airport approach and landing systems can be divided into two categories: non-precision and precision. The non-precision system is comprised of low power NDB's, VOR's and stand-alone localizers (LOC) which in some cases are supplemented with DME (LOC/DME). The precision system consists of the ICAO standard Instrument Landing System (ILS). The precision system uses both elevation and azimuth guidance from the ground facility as well as marker beacons and locator NDB's and in some cases DME. The non-precision approach uses only azimuth guidance and as a result such approaches permit landings only under higher weather minima than the precision system.

The terrain in the remote areas of the provinces places severe constraints on the siting of airports and navigational aids. Geography plays a significant role in mountainous regions, often severely limiting navaid and communications propagation in mountain valleys and dictating runway orientations. Even if these limitations are accommodated, suitable terrain for airports simply is not available in many areas and a large number of those which do exist are operationally compromised by the surrounding terrain.

Climate is exceedingly diverse in the northern areas and a number of heavily used airports experience high frequencies of weather below Visual Meteorological Conditions (VMC) and even below typical IFR minima. Extreme amounts of precipitation and snowfall are typical of northern and remote areas of the provinces. It is common that some of the airports experiencing the worst weather conditions are also surrounded by some of the most difficult terrain. This is particularly true in British Columbia, for example where an analysis of weather records collected for the 10-year period 1963-1972 for selected coastal and interior stations clearly illustrates the problem. Ceiling and visibility below 1,000 feet above ground level and 3 horizontal miles visibility determines Instrument Meteorological Conditions (IMC) which inhibits VFR operations. A ceiling of 500 feet and 1 mile visibility is usually the lowest limit permitted for an NDB approach, which would be the most common type of instrument approach for sub-regional and local carriers operating IFR. A ceiling of 200 feet and half-mile visibility is the lowest limit common to a Category 1 ILS approach.

Without suitable enroute and approach aids, and communications, isolated sites remain dependent on day VFR operations. In the weather conditions that prevail in these areas, as much as 1/3 of the daylight hours will not be VFR conditions on an annual basis, and the regularity and safety of air service cannot be depended upon.

Transport Canada's new draft policy on provision of airport approach systems and services is of questionable value to sites in the more remote areas of the country. The policy is directed at Transport Canada owned airports, designated reliever airports and airports serving a CTC Class I or II commercial air service.

Clearly the sub-regional and local carriers are critical to many areas of the country but unfortunately, it is these same areas which often are least well served by airports with suitable approach aids. From a national perspective, the traffic volumes involved in many of the routes served by sub-regional and local carriers may be low but to the small and relatively isolated communities served, aviation is critical to their survival in some cases.

The Dubin Commission of Inquiry on Aviation Safety specifically addressed the shortcomings of air navigation services and systems in the Northern parts of the provinces. Although the bulk of the data brought before the Commission this subject was related to Northern Ontario, the Commission concluded generally:

(a) "that there has been a concentration in enroute aids to the detriment of approach aids".

The Commission recommended that:

(a) a policy and program for the provision of navigation aids be developed that includes a greater regard for the special hazards encountered when flying into airports in the remote areas[1].

(b) That programs similar to the Arctic Air Facility Policy be applied to all remote areas[2].

(c) that Transport Canada, in association with other appropriate governmental agencies, should immediately embark on a program to train native people in the remote areas of Canada in order to provide them with the skills required for radio operations, airport maintenance and weather data interpretation, and thus enable them to provide advisory

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1 Dubin, Vol. 3, p. 810
2 Ibid, p. 811

service to aircraft similar to the program referred to as the Arctic Airports program established in the Yukon and the Northwest Territories, and to the program in Northern Manitoba[3].

(d) Transport Canada determine the requirements for aviation weather services, and that weather services for general aviation should be given a higher priority[4].

In the near future, development of the air navigation system in the Northern points of the provinces will continue to slowly develop. Figures 10 and 11 show the planned locations for non-precision approach aids in 1990 and 2000 respectively.

The point which is reinforced in CATA planning documents is that an air transportation network must be conceived of as an integrated scheme of sub-systems. There is little point in improving one aspect to the neglect of the others because the level of safety and reliability will most likely be determined by the least developed component. The cost benefit ratio of a good runway is reduced if it is useable only in good weather and daylight conditions. Thus, the concept of a systems approach should be borne in mind particularly when considering infrastructure in remote areas.

4. Communications

In addition to the network of navigation beacons and stations which assist the pilot in aerial navigation, ground to air communications are an important component of safe flight operations, particularly in remote areas.

In spite of this, there are many of the commonly travelled visual flight routes which offer no such service or inadequate service. In some cases, a Remote Communication Outlet (RCO) has been installed by which the pilot can communicate with an associated Flight Service Station (FSS). However, there are vast distances in northern provincial areas where no form of communication is possible with any ground station. For example, between Prince George and Watson Lake B.C., there is only one station at MacKenzie for over 1300 kilometers (800 miles) and rugged flying. Similarly between Smithers and Watson Lake or Vancouver and Williams Lake. Along the heavily travelled coastal routes, communication with the ground is an exception rather than the rule at low level altitudes. Figure 12 shows areas of responsibility assigned to Flight Service Stations in Canada.

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3 Ibid, p. 845
4 Ibid, p. 1013

Figure 10. 1990: Non Precision Approach Aids

Source: Canadian Airspace System Plan, April 1983, TP 4334

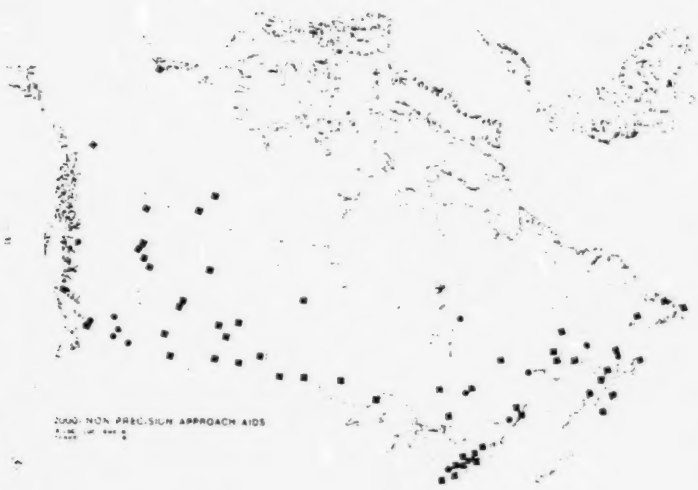

Figure 11. 2000: Non Precision Approach Aids

Source: Canadian Airspace Systems Plan, April 1983, TP 4334

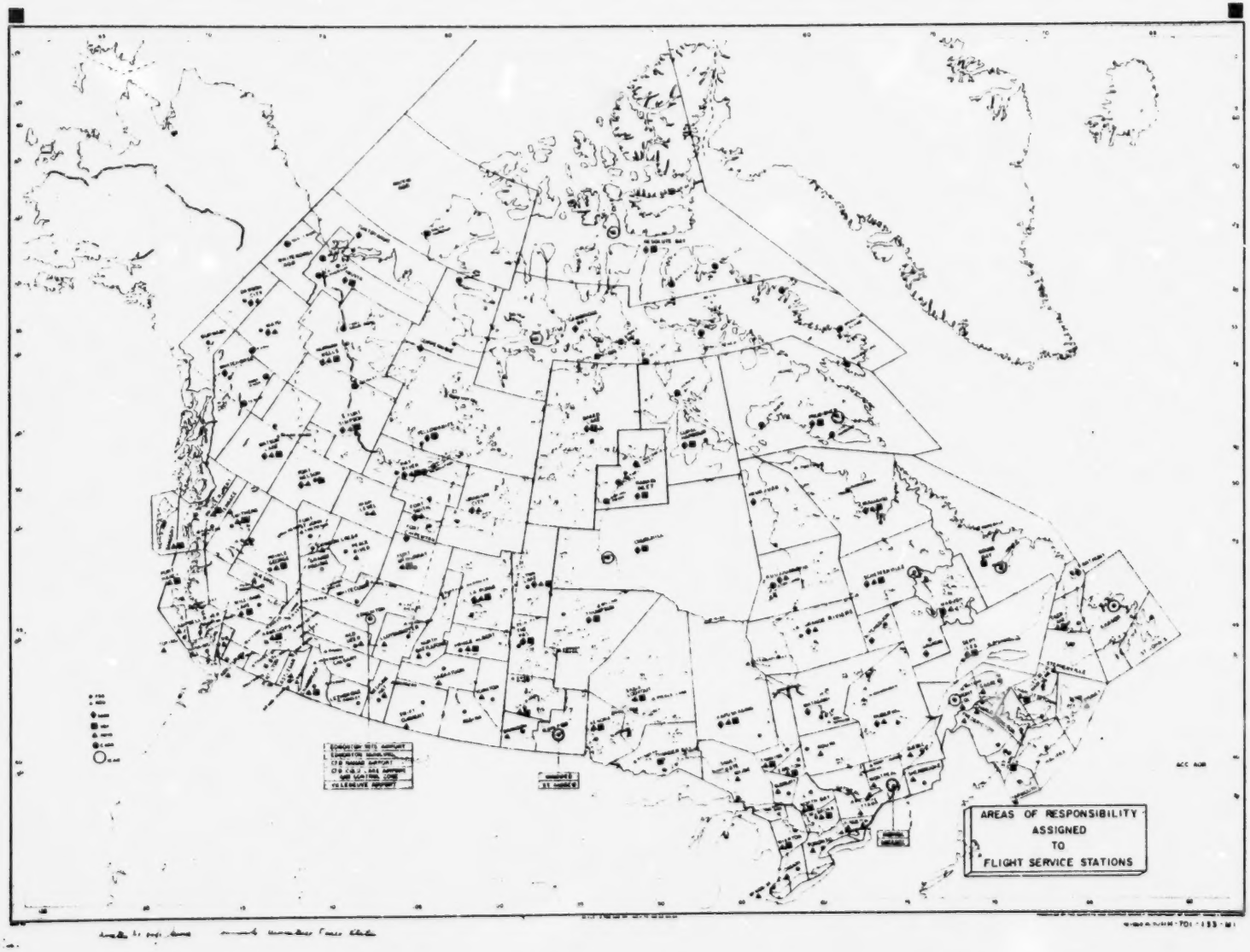

Figure 12. Areas of Responsibility Assigned to Flight Service Stations in Canada

Air Traffic Services (ATS) provides a dedicated phone network connecting Flight Service Stations with traffic controllers. A pilot who is able to reach an FSS by either radio or telephone can file a flight plan and receive IFR traffic clearance to enter the traffic control system prior to takeoff. Updated weather information is also available. However, telephone communication is not available at many departure points, particularly in remote areas. This forces the pilot to embark on the mission and wait until within radio range of an FSS or ATS facility to airfile, at which point the aircraft may already be in the midst of bad weather or other enroute traffic.

According to the National Airspace Plan (Phase II), the outlook for improvement in communications facilities is considered bleak until the conversion process to digital communications' techniques is begun. At the present time, Transport Canada's analysis concludes that existing national policies do not provide clear cut objectives, plans, programs, funding or timetables to correct present deficiencies. There is presently no overall plan to improve the communications system. Although there has been an increase in the installation of Remote Communication's Outlets (RCOs) and PALS such as to facilitate the extension of the Montreal IFR to accommodate an increase in the provision of bilingual air/ground communications in the province of Quebec, these efforts are designed and intended to satisfy specific requirements rather than being part of an overall national communications plan. What is required is a national survey of the existing communications coverage areas to accurately identify existing communication coverage gaps. A comparison of the theoretical coverage to the actual coverage would also be helpful.

The identification of gaps in current communications coverage particularly at low levels (below 12,500') would certainly prove beneficial in planning the numbers and locations of future installations to satisfy whatever degree of communications coverage is considered desirable.

E. Aviation Weather System

The Federal Government agency responsible for providing meteorological services is the Atmospheric Environment Service (AES) of Environment Canada. The Canadian Air Transportation Administration (CATA) is responsible for the level of service including: dissemination of aviation weather, identification of the location of aviation weather offices, and the provision of resources. This aviation weather service is provided through several agencies including: AES, CATA's Flight Service Stations (FSS), Arctic Aviation Weather Reporting Stations (AAWRS), Contract

Aviation Weather Stations (CAWS) and Private Aviation Weather Reporting Stations (PAWRS). AES offices located at airports may provide aviation weather briefings, but the prime disseminators of weather information to aircraft operators are the FSS specialists. AAWRS and PAWRS personnel are trained and periodically evaluated by AES. CATA identifies the operational requirements and provides funding for the AAWRS, but the personnel manning is a responsibility of the Territorial government. PAWRS must meet CATA specifications for approval. They are funded and manned by non-federal sources to satisfy localized aviation requirements, except in special cases, where a specified level of service is provided, some federal assistance and funding is provided.

There are approximately 300 locations throughout Canada that take weather observations. Less than half provide hourly weather reports 24 hours per day. The remainder provide from as many as 18 to as few as 4 observations per day. Some isolated sites provide observations only on demand. Therefore, the detailed aviation forecasts that are issued four times per day are prepared, at times, from information derived from observations taken from less than 50% of all the locations.

Weather information is collected manually except for some limited data provided by approximately 60 AES automatic devices located across Canada. This information is transmitted to the AES weather computer (Toronto) which distributes it to appropriate ATC, FSS and other agencies. The computer also analyses and processes it into basic weather forecast information before being retransmitted to area weather offices located across Canada. The aviation weather forecasts are then prepared in the area offices and subsequently disseminated to various subscribers including ATC facilities, FSS, AAWRS, PAWRS, CAWS and commercial operators. In addition satellite and AES weather radar data contribute significant information for aviation weather forecasts while CATA radars provide real time imagery of existing weather conditions.

Pilots acquire weather information from the various agencies primarily by phone or by personal contact. Additional information is available while airborne or on the ground through Transcribed Weather Broadcasts (TWBs), air-ground radios, commercial TV and radio weather programs, Automatic Terminal Information Service (ATIS), and various other auxiliary systems. In areas where there is a high volume of air traffic, dissemination of aviation weather to the pilot is a major problem as phones are generally busy and most public weather reports on radio and TV are not of the quality required for aviation.

The aviation weather system is not without problems. Many of these are particularly acute in remote areas of the country where often weather conditions are more adverse and facilities are scarce. There is no legal requirement for the provision of weather services, although it is Transport policy to provide them at sites that have Class I air service. Consequently at the 1200 airports in Canada there is only full time observation (24 hours) at 10% of them. This results in large gaps in information over the 24 hour period particularly in remote areas of the country. By looking at the maps it is possible to see many areas of frequent departure where a pilot planning a flight will be unable to get any weather information. For example, a pilot leaving from most of the coastal inlets in British Columbia will not be able to get the Vancouver weather until he has reached altitude and thus able to communicate with a Flight Service Station (FSS). Similarly, a flight from say Williams Lake to Bella Coola will have to take place with little advance information on en-route or destination weather.

Lack of telecommunication circuits is also a major problem in remote areas. Transport Canada has made attempts to get weather information relayed to pilots by hiring people from remote areas to phone in basic weather information 4 times a day. However, they have had trouble getting people on a reliable basis to provide this service.

The panacea for remote areas in many peoples' opinion lies in the Automated Weather Observing and Reporting Systems (AWORS). Aviation weather service will be improved in quality and timeliness through automation. 300 observation sites will be fitted with Automated Weather Observing and Reporting Systems (AWORS) over the period from 1985 to 2000 (Figure 13). These will transmit pertinent aviation weather data to the central AES computer through CATA aviation weather processors.

The AWORS can provide hourly observations to the teletype circuits feeding the weather data base. This data makes it possible to provide forecasts but it also can be used directly by the pilot for planning purposes. AWORS can also provide readings at one minute intervals and these, if broadcast, give the pilot the current readings used for landing and takeoff. An AWORS therefore serves two purposes - relieving the FSS specialist of the task of taking weather observations and placing them on the teletype circuit, and of giving pilots on approach and takeoff the current weather readings.

The AWORS is a modular system which can provide a full set of weather parameters including ceiling and visibility or it can be a rather rudimentary system providing wind (speed, direction, and gusts) temperature/dew point and barometer readings. It could in fact be anywhere between these two extremes, the service provided being determined by needs at that location. At this time, CATA,

Figure 13. Automated Weather Observations System

for planning purposes, envisions a mix of 50% full stations and 50% rudimentary stations. In their assessment of costs of installation and support services, isolated sites (probably unattended) are forecast to cost 25% higher service/installation costs than an AWORS at an existing Transport facility that can provide power and shelter.

Increased contracting out for weather stations has been ruled out as an effective solution. The AWORS program will be of most benefit to the following types of sites:

(a) Isolated Sites - AWORS can operate unattended at locations where staffing a weather station is impractical but where there is a gap in coverage;

(b) Airports without Communications - At these sites AWOKS will give the pilot ground information unobtainable from any other source;

(c) Airports with Remote Communications Outlets - The FSS can give the usual advisory service over the RC link but AWORS will give the current weather which the distant FSS specialist can't read; and

(d) Airports where there aren't 24 hour FSS Operations - AWORS will provide weather over the quiet hours.

The current priorities on AWORS installations will be airports having no communication and substantial traffic volume, followed closely by RCO stations and isolated sites.

II CURRENT ISSUES

A. Outstanding Issues

It is clear from a review of the initial work carried out in 1975-1977, and from an analysis of federal and provincial programs since then, that much of the intent of the original policy and program concepts has been satisfied. There remains, however, a number of major issues to be addressed.

Federal Responsibility

1. Is it a federal responsibility to provide:

   (a) airport infrastructure in remote areas within the provinces;

   (b) air navigation aids and weather services in remote areas within the province; or

   (c) air service subsidies for routes within the provinces.

2. What are the consequences of the federal government initiating policies and programs in areas where the provinces have carried out the bulk of the activity in recent years?

3. Does Transport Canada have unique responsibilities to provide airstrips and related services on Indian reservations?

Existing Policy/Programs

1. Can existing programs be used to satisfy remote goals? Are they being used this way now?

Air Navigation

1. Can privately funded, operated NDB's be incorporated into the Transport Canada system? Is a lower reliability standard for an NDB better than no NDB at all? Should the first priority be to replace private NDB's or to expand the network of NDB's?

2. Will existing programs satisfy the Dubin Commission recommendation on special efforts to improve air navigation facilities and services in the Northern area of the provinces?

B. Policy Objective

With the knowledge that there are remote access issues that have not yet been resolved, the objective of this policy discussion paper is:

To propose a policy and programs for federal involvement in improving accessibility to isolated areas within the provinces.

C. Criteria for Evaluation of Proposed Programs

The recommended policy and associated programs for the provision of airport and air navigation facilities at remote sites will be selected on the basis of criteria listed below. No weighting has been assigned, as all criteria are considered of equal importance.

1. Consistency with Federal Responsibility as Established by Legislation or Precedent

Since the first initiatives in the area of "Remote Access" in 1974 many programs initiated by other federal departments such as DIAND, DREE etc. have come into being. Additionally the provinces themselves have made considerable progress in airport programs aimed at reducing isolation in primarily northern areas. All of these policy and program developments have taken place in the absence of a clearly defined federal/provincial role statement with respect to involvement at remote airport sites.

Legislatively the provision of financial or other forms of assistance by the Minister of Transport to remote sites is a matter of policy rather than of legal obligation.

2. Cost Effectiveness

The recommended policy and programs for Remote Access will be ranked on the basis of cost effectiveness. Cost effectiveness will not be defined as the greatest number of sites assisted for the minimum amount of expenditure but rather where expenditures best accomplish overall program objectives from a systems or network perspective.

3. Administrative Simplicity

The policy and associated programs proposed will be ranked according to their simplicity and ease of administration. Programs requiring a complex management structure or complex calculations either federally or federal/provincial will rank as less desireable than those requiring a minimum of bureaucracy.

4. Equitability

The criterion of equitability for any proposed policy or programs related to the relief of isolation has two components. The obvious aspect of equitability for federal programs is regional fairness. Federal programs should be designed to allow balanced provision of assistance to all provinces. This objective however must be mitigated by the second component.

The Atlantic Provinces by and large for example, with the exception of Labrador and some parts of Newfoundland have very few "remote" sites. British Columbia, Ontario and Quebec on the other hand may have a greater number of "remote" sites requiring air access and thus exhibit a higher "need".

5. Consistent with Existing Policies/Program

Policy options will be ranked with respect to their consistency with existing policies and programs. (Arctic Air Facilities program, capital assistance program, DREE programs, etc.)

6. Program Flexibility

The flexibility of a remote access policy and its programs is an important criterion. The recommended option will be one which will be responsive to availability of resources and will enable the government to accelerate or decelerate programs as financial circumstances dictate without jeopardizing the intent of the overall program.

7. Logical Consistency

The recommended option will be ranked as to its logical consistency with the objectives trying to be achieved. For example policy and associated programs should result in priority given to larger and more isolated sites and/or routes.

8. Safety

Given that safety is a prime objective of CATA, the recommended option will contribute to the enhancement of the level of safety at both the individual site and system level.

III POLICY OPTIONS

A. General

Transport Canada through its existing programs has been a major player in providing for safe and reliable air transportation to isolated areas. There is no reason to suggest that as an overall policy CATA will not continue to fulfill this role.

In the future, Transport Canada could choose to introduce or amend programs in airports, air navigation, or air carrier support as part of a policy to improve aviation services in isolated areas. Figure 14 illustrates the broad range of options that could be considered. A complete program in support of a remote access policy could be selected from one of the three major sub-areas, or could be a combination of specific elements from all three.

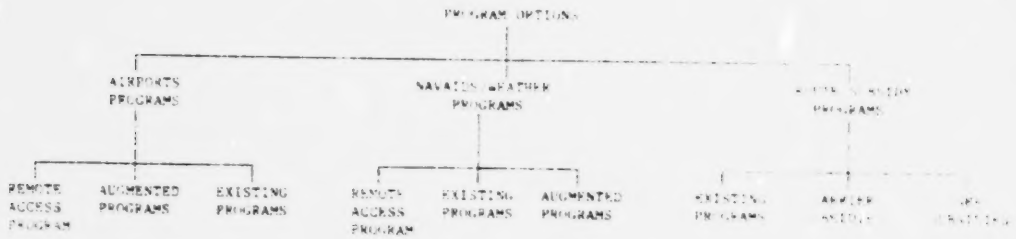

Figure 14. Program Options

Existing programs are defined as a continuation of present programs without modification. Augmented programs are defined as a continuation of current programs, with some modification or augmentation to address specific problems; augmentation may imply some increase in funding or a shift in priorities without funding increases. Special remote programs are defined as national programs, separately funded and designed to address widespread remote access problems.

B. Airports Programs

The construction, maintenance and operation of airports has been used in the past as the most immediate and effective way of improving access to isolated communities. As was shown in Section I, both the federal government and the provinces have been active in developing or contributing to the development of these types of airstrips. In fact, only 13 of the sites from the original lists have no airstrip in place or planned.

Of the 247 sites designated as service points on Class 3 licences which are not international, national or regional airports and not previously identified as potentially remote, only 4 sites fit the original definition of remote (and an additional 4 have only year-round float plane access).

In examining the progress in airstrip development a number of patterns emerge:

1. The vast majority of sites developed since 1975 have been provincially funded, including those on Indian Reservations.

2. There is a disparity in access to isolated communities between provinces as a result of federal and provincial actions. In 1975 sites identified as isolated were distributed across the country. By 1983, the programs of the provinces West of Quebec have provided for all but 7 of the sites identified in those provinces. As a matter of policy, however, Quebec has not been active in airport development. Thus even though current federal programs will provide facilities at 16 remote Quebec sites, a further 6 sites identified in 1975 or 1977 as isolated still do not have airstrips. Newfoundland has not been active in airfield development either, but current federal programs will provide adequate facilities.

3. Federal involvement has been primarily through regionally specific programs (Quebec, Labrador) rather than national programs.

4. Federal and provincial programs have tended to ignore the facilities required for year-round float plane services, even though these services provide the same isolation relief role as regular land based aircraft services. Of sites which still meet the isolated definition, 12 are year-round water aerodromes. An additional 16 year-round aerodromes may be serving isolated communities of over 100 population based on the E/D traffic figures.

The heavy involvement of many of the provinces in airfield development in remote areas in the past 10-15 years limits the practical options available to Transport Canada in this area. An overall federal program similar to that envisaged in 1975-77 would be inconsistent with precedent, would discriminate against those provinces which have chosen to make expenditures in this area.

Special Remote Airports Program

One argument that is frequently forwarded for a national program in the remote areas of the provinces is the precedent set by the Arctic Air Facilities program in which the federal government has provided airports as well as air navigation facilities and services

in the North. Clearly however, the situation is somewhat different in the provinces. As Appendix G shows, it is not a statutory responsibility of the federal government to provide airports. In the Arctic where the federal government is ultimately responsible (through federal departments or the territorial governments) for all facilities and services, the federal government clearly has a role, but this does not imply a precedent for action within the provinces.

Existing Airports Programs

One option for federal action in the provision of airfields in remote areas is a continuance of existing programs; the status quo option. In 1983 the status quo encompasses the revised airports capital program (which specifically excludes the development of new sites in its definition), and 2 Regional programs (Quebec & Labrador) designed to address specific problems at specific sites. When these two Regional programs are completed, no programs will exist in CATA to permit development of new airfields at remote sites.

In view of the high general success rate in providing airstrips to relieve isolation (through federal and provincial efforts), this option looks promising: it would be largely consistent with precedent in that it would leave any action to the provinces; and it would be cost effective, consistent and simple. It is weak on two areas, however; equity and flexibility. Existing programs would leave no flexibility to address unique problems that could arise from time to time. In addition, federal action has included regional programs to address special issues in the past, so that there exists some inequity between regions. To permit some action in the future additional flexibility would be desireable.

Augmented Airports Programs

The third option for airports programs is to provide for a modest augmentation of existing programs by amending the existing conditions of the capital assistance fund to permit the development of new airfields in areas that meet the definition of remote, and by introducing a regional specific program to address the outstanding problem area of coastal B.C.

The broadening of the terms of the capital program would not require the federal government to take action but, within the remote/isolated financial constraints of the program, would permit the minister to take action in unique cases.

In addition to the 13 sites identified in the 1975 and 1977 studies which remain isolated by definition, 2 additional sites in B.C. from the original lists have only year-round float plane service as an access mode. As Appendix D and Tables 13 and 14 illustrated,

the vast majority (20/26) of the remaining communities designated as service points in Class 3 licenses that meet the definition of isolated are coastal communities in B.C. A total of 22 B.C. coastal sites have year-round float plane service as their only mode of access. In many cases, however, float plane facilities are inadequate or non-existent.

One indication of the degree of isolation of these communities is their designation as air stage points by CANADA POST. Air stage postal service is provided for any community of 50 families with no year-round surface access, and with a minimum separation from other post offices. Appendix F lists 38 air stage points on the coast of B.C.: 14 of these have federal float plane facilities and 3 have private. The remaining 21 sites have no float plane facilities.

In this area, there will be no upgrading to land airports in the foreseeable future because of the terrain. Thus, float plane service will continue to provide the only means of access to these communities. At land airports, the federal government contributes to the safety and regularity of service through its air navigation infrastructure and services, but this is not possible at this time at water aerodromes. Any federal effort to improve access for these year-round float services must therefore be primarily directed at the aerodrome infrastructure. The expansion and continued maintence of a network of Transport Canada floats for water aviation services would provide the infrastructure base. The provision of float plane facilities by CATA can be compared to the provision of navaids at land airports in that it directly addresses a safety issue. The mixture of vessels and aircraft using a common congested facility is a safety hazard, as is the enplaning and deplaning of passengers from float planes into boats or inadequate wharves.

A regional program, which would provide adequate seaplane facilities at many sites, could be provided at very low cost. In addition to addressing the one remaining major area of isolation, the program would have other benefits. It could provide for the day to day maintenance and replacement of existing Transport Canada float plane facilities which is a recurring problem under current programs. Although aircraft floats are reasonably cheap to provide (approximately $20,000/site if a wharf exists), maintenance costs are proportionally higher than for land sites, and the service life can be expected to be 5-7 years. In establishing a float plane program, it is proposed to include the maintenance costs of the 51 existing CATA floats within the framework of the program. The proposed program would:

(1) apply to tidewater sites only.

(2) be applicable for capital and O&M for floats, for wharves in cases where no suitable wharf exists, and for the provision of hazard beacons where justified by the potential for aircraft-vessel collisions during landing and takeoff.

(3) provide new capital facilities only at communities of over 100 population lacking year-round access by road or rail.

(4) permit regional priority setting for capital in consultation with the province and users.

(5) permit operators wishing to base aircraft at a site to add their own floats to CATA's, but not to use the CATA float as a base.

(6) permit third parties (carriers, fuel companies, communities) to develop and operate fuel operations on their own floats adjacent to the CATA floats at selected sites. Permitting the installation and operation of fuelling adjacent to CATA floats would be directly analoguous to the existing arrangements for hydrant fuelling at major CATA airports.

(7) permit Transport Canada to contract out construction, installation and maintenance of the floats and wharves to DPW.

An examination of possible funding levels for such a program indicates that a total program of $300,000/year (83/84$) for capital and O&M would be adequate. The capital portion of the program would be used for major replacement of floats and for new floats at new sites. This portion of the program would average $150,000/year. The total existing program is $140,000 year, of which $50,000 is capital.

C. Air Navigation Programs

Three broad options are possible for the provision of navaids, communications and weather services in remote areas: a special remote areas program could be developed, existing programs could be used, or modified/augmented existing programs could be employed.

Radio Navigation Aids

Insofar as the provision of radio navigation aids is concerned, progress in remote areas has been substantial in the past 10-15 years. In addition to the many sites where Transport Canada has installed NDBs, there are many provincial installations in Ontario,

Manitoba and Alberta. Although the private NDBs do not achieve CATA standards for monitoring or auxiliary power, they do augment the federal aids and provide non-precision approach capability at sites that otherwise would have no facility.

The Ontario-CATA program appears to be particularly successful. Although this program will result in CATA installation of NDBs at sites that normally would not receive installations at this time, the cooperative program appears to be working well from federal, provincial and user perspectives.

Although each province has different types of airport programs, the intent and cooperation of the Ontario agreement serves as a model for other areas. It would be particularly beneficial in B.C. where the current coverage of enroute and terminal navaids is not developed to the same extent as in other provinces, and where provincial and federal plans appear to be in conflict. The Province, having invested in airports in the remote areas, expects CATA to provide a system of enroute and approach aids. The CATA Region citing high installation costs, high minimum enroute altitudes which make many routes suitable for small aircraft, and low traffic levels, cannot justify the navaids under existing policy. An agreement similar to the Ontario-CATA agreement would achieve a common understanding of priorities.

There does not appear to be a widespread problem in the provision of enroute or approach radio navaids in remote areas that would justify a specific national remote policy particularly if the funding for a special program were to come from existing expenditure levels. The "black hole" that the Dubin report identified in Northern Ontario had provincial NDBs in the past and will be well provided with CATA NDBs when current programs are completed.

Communications and Weather Services

In communications and weather services the picture in remote areas is not as bright, and a unique national program may be justified, even if the program only identifies the seriousness of the problem and sets priorities for the development of facilities and services. Inadequate weather information collection and dissemination for low level aviation was the one common complaint brought out in user, provincial and CATA Regional consultations.

Two initiatives are underway which may result in a national program to improve weather services in remote areas: the Aviation Weather Services study currently underway in Management Services, and the programming recently started for the Automatic Weather Observing and Reporting Stations (AWORS). The weather study will be able to

identify many of the specific areas of inadequate coverage, and AWORS should in the long run introduce the capability of installing low capital cost, low operating cost weather stations at many sites previously unserved. The AWORS approval-in-principle document recognizes this possibility and recommends that priority be given to remote sites currently without any weather collection and dissemination, and that 70 of the 350 sites to be provided with AWORS be new sites where coverage does not exist.

One recurring issue identified by Regional specialists, is the need to identify air navigation facilities and services in remote areas as "bundles" or systems, so that for planning, programming and installation, all the required facilities and services required for a particular type of air service can be brought into place at one time. Table 18 is the type of systems approach required. Systems requirements have been used in the past at the planning stage, but not generally for the programming and implementation of facilities and services at a site.

Table 19. Minimum Approach Systems for Remote Areas

	Medium Intensity Lights Runway	Low Intensity Approach Lights	NDB	Altimeter* Setting	Wind* Indicator
PROVIDED BY	PROV./OTHERS	PROV./OTHERS	CATA	CATA/OTHERS	CATA/OTHERS
DAY IFR					x
NIGHT VFR	x				x
IFR Circling	x	x	x	x	x

* Manned or AWORS

One impediment to the systems approach is the wide variety of views among civil aviation personnel as to those facilities and services that are the absolute minimum required for particular types of aviation (day VFR, IFR) at the small airstrips in remote areas.

The problem faced in providing air navigation services and facilities in remote areas is not one of a lack of knowledge, but of insufficient resources. To facilitate the most cost effective approach to air navigation problems, it is proposed that a short intense workshop of regional and headquarters specialists:

1. develop and reach a consensus on minimum systems "bundles" for various types of aviation and traffic levels in remote areas.

2. develop and reach a consensus on a Remote Areas Air Navigation Requirements plan which would, without identifying years for funding, establish a national priority plan for the provision of weather services, communications and radio navigation aids in remote areas.

What is being proposed here is not a year long area master plan to be superimposed in existing area plans, but rather a group effort, drawing on existing area plans, the DGMS weather study and the detailed knowledge of regional staff of local problems. A workshop approach is proposed because a common interpretation of existing policies could be achieved. To permit this approach to be successful, preliminary work by headquarters would be required, as would documentation of the results.

The need to achieve a common interpretation of policy is indicated by the differences in interpretation that now exist, for example:

1. One Region has purchased and maintained provincial NDBs on a cost recoverable basis for years, while another Region has been told it is not possible to do so.

2. Regions apparently have been applying different interpretations to the requirement that navaids be installed only on federal land.

3. One Region, to the benefit of aviation in remote areas, has installed only high powered NDBs as approach aids in remote areas because of the additional area of coverage provided.

In all of these cases, the interpretation most favorable to the needs of remote areas has been the most successful. The provinces, although they are prepared to pay for the capital and operating costs of developing the air navigation system faster than Transport Canada's resources permit, lack the staff and expertize to purchase

and maintain electronic navaids. Where the aids could eventually form part of the national system, it is clearly a very cost effective approach from a Transport Canada perspective to permit the acquisition and maintenance of these aids on a cost recovery basis. If structured so that CATA will only purchase and maintain for others those aids that meet CATA's standards for signal etc. (not necessarily for back-up power and monitoring), it has the added benefits, of improved reliability and the ability of Transport Canada to take over and upgrade without replacing the transmitter at some future date.

Typical NDB installations in remote areas cost $250,000. The difference in cost between a low powered NDB (25 W) and a high powered NDB (100 W) is $10,000, or 4% of the total installation cost. The difference in operating costs per year at a 3¢/kilowatt hour is $20.00/year. Thus the installation of a high powered NDB in lieu of a low powered NDB in remote areas where frequency conflicts are not a problem, is not a major cost issue. Given the few airfields in these isolated areas, any additional facility coverage which is more forgiving of errors can only improve safety. The high powered NDB does provide an additional safety margin. One issue on the installation of NDB's at remote sites which is not central to the remote access issue, but which diminishes resources available for navaid installation, is the lack of cooperation at the community level. For example Pikangikum, having made an issue of the lack of navaids during the Dubin Inquiry, now refuses to permit the installation of the NDB on the Indian Reservation. Additional costs for extra roads, power lines etc. can be expected to exceed $0.5 million, the cost of two additional NDB installations at other needy sites. If it can be assumed that the prime purpose of an approach aid is to benefit the community with improved regularity of service, the imposition of unnecessary additional costs on CATA to satisfy community objectives seems inappropriate. The community, other agencies (DIAND for example) or provincial governments should be expected to make up the extra costs imposed.

Operators in remote areas are turning more and more to alternative navigation systems (Omega, Loran C). Indeed the National Airspace plan (Brown Book) suggests that for remote areas, these systems will provide the air navigation system in the future. Unfortunately, there is some confusion among operators as to CATA's official position is on these systems today, and what it will likely be in future.

D. Subsidy Options

In 1975-1977 one option that was examined was the subsidy of air services to remote areas, either as direct subsidies to the carriers, or as subsidy to the users. At that time it was proposed

to restrict subsidies to sites which had less than 5 flights per week, and which did not have seasonal resupply of freight. Twenty-four communities were identified which fit the criteria. Federal/provincial cost sharing (50/50 or 60/40) was also proposed. It was also proposed that the subsidy would be sufficient to allow the serving carrier to lower freight rates to those charged by the regional carrier or by charter carriers in the area, whichever was greater.

The subsidy option was not ruled out in the 75-77 policy papers, but was left open for further investigation.

Today, the number of subsidized services is very limited: EPA is subsidized on its services to Goose Bay and les Iles de la Madeleine; Quebecair is subsidized on the lower North shore of the St. Lawrence from Sept-Iles to Blanc Sablon; Quebec Aviation is subsidized for its service Fredericton-St. Léonard-Quebec, and Perimeter Airlines for Winnipeg-Dauphin-Yorkton.

The federal government has attempted to keep the number of subsidized air services to a minimum, and has also tended towards subsidizing regional rather than local services. Overall Transport Canada's experience with service subsidies (rail, marine, freight rates) has not been satisfactory. As recent auditor general reports have pointed out, subsidy programs by their nature tend to grow in cost far beyond projections, and to be very difficult to reduce or terminate.

Substantial quantities of freight, particular food, is already moving to remote areas on a dramatically subsidized basis through the use of parcel post. Even major shippers such as the Hudson's Bay Company are moving wholesale goods in this manner.

Even if a detailed study of air service subsidies found air service subsidies to be the most cost effective way of improving access and quality of life in remote areas, it is not at all clear why the federal government would be directly involved in a subsidy program. The jurisdiction and responsibility can more logically be considered to be provincial, and there are provincial air service subsidy programs in place. A service subsidy program is completely inflexible in response to available resources; once commenced it can be expected to draw appropriations indefinitely.

There may be some redeeming features of an air service subsidies program for remote areas, but given the multitude of federal subsidies and support programs in place (Canada Post, Diand, etc) and provincial programs, it would take a major economic study to identify the total existing subsidy level for goods and servies, and to determine the requirement or justification for additional subsidy programs.

E. The Preferred Option

Table 19 summarizes the preferred option for each of the components of air service in remote areas.

Table 20. Preferred Options

	National Remote Program	Status Quo	Augmented Program
AIRPORT PROGRAMS			x
ELECTRONIC NAVAIDS			x
WEATHER & COMMUNICATIONS	x		
SERVICE SUBSIDIES		x	

Overall, the federal policy on remote access would be a composite of airports, and air navigation programs. Although the provinces have been very active in providing airports in isolated areas, the magnitude of the air navigation programs mean that the federal government will remain the major player in supporting aviation in this areas in terms of expenditures and expertize. Accordingly, it is proposed that CATA adopt as a policy on access to isolated communites:

CATA will facilitate safe and reliable air access to isolated communities within the provinces by:

(1) installing and operating the enroute navigation system as required by CATA standards.

(2) installing and operating electronic terminal navigation aids where justified by CATA standards or where required by federal/provincial agreement.

(3) assisting the provinces in the acquisition, installation and maintenance of terminal navaids on a cost recovery basis.

(4) providing training to provinces in the selection and maintenance of electronic navaids, VASIS and airports where this does not cause undue strain on existing resources.

(5) operating directly or through contract adequate communications and weather services.

(6) contributing to airport development in special cases through the airports capital assistance program.

(7) funding the capital and maintenance costs of float plane facilities where float plane services provide the year round transportation system to isolated communities of over 100 population.

F. Financial Implications

CATA has steadily improved the air infrastructure in remote areas under existing programs and will likely continue to do so in the future. To accomplish the augmented programs proposed in this paper, only modest resources would be required.

	ADDITIONAL PROGRAM OR ELEMENT PROPOSED	INCREMENTAL P.Y.	INCREMENTAL (1983 $)
(1)	To maintain electronic navaids on behalf of others. Based on 1-2 person-years in each of Western, Central and Ontario regions (.029 p.y. per NDB as per Telecom staffing standards)	0-6	-
(2)	Training for airport operators, provinces in the maintenance of airports, VASIS, NDB. Based on 1 training specialist in each Region.	0-6	0-$150,000/ year
(3)	Installation of high powered NDB's only at remote sites.	-	$10,000- $30,000/yr
(4)	Refusal to pay for extra costs of unreasonable demands re NDB locations in remote communities		($250,000- $500,000)/ yr saving.
(5)	Negotiation of B.C.-federal agreement. Assume 1-5 sites where early installation of NDB or VOR is agreed upon. Assume 5 year program.		$200,000- $3M/year

ADDITIONAL PROGRAM OR ELEMENT PROPOSED	INCREMENTAL P.Y.	INCREMENTAL (1983 $)
(6) Year-round float plane facilities		$300,000/yr
		$10,000 - $3.3M/year over a 5 year period

The estimates shown are order-of-magnitude only, to give an initial impression of the costs of those items proposed that would lead additional costs. All other items are included in existing programs.

IV CONCLUSIONS & RECOMMENDATIONS

A. Federal Responsibilities

Conclusion 1. Because of the number and diversity of pressures on Regional Offices to provide air facilities and services in remote areas, there is a need for a clear definition of the facilities and services that will normally be assumed as federal responsibilities.

Recommendation 1. That Transport Canada as a policy, clearly accept responsibility for:

(1) The provision of enroute aids and terminal aids where justified by Transport Canada standards or by federal-provincial agreements relating to remote public airfields regardless of the ownership of the airport.

(2) The provision of communication and weather services (FSS, RCO) where justified by current standards.

(3) On request, the purchase of electronic navaids on behalf of others (provinces, private) on a cost recovery basis.

(4) On request, the maintenance of private electronic navaids (provincial, other) on a cost recovery basis.

(5) On request, the provision of training for provincial staff in the maintenance of airports, Vasis, and NDB's; and in the preparation of specifications for NDB's. This assistance would be considered to be temporary in nature, where the number of installations is too small to support provincial or private expertize.

Recommendation 2. That a Cabinet submission be developed, requesting omnibus permission to provide air navigation facilities and services behalf of others on a cost recovery basis.

Recommendation 3. That, in consultation with Treasury Board, a mechanism be developed for additional obtaining person-years for the work loads associated with undertaking radio navaid maintenance work on behalf of others (on a cost recoverable basis) and for providing maintenance training to others.

Recommendation 4. That Transport Canada not be involved in:

(1) Additional programs for construction of airports in remote areas (including those on Indian Reservations) or for contributions to non-T.C. airports other than those programs already in place.

(2) The provision of lighting, hazard beacons, etc. on non T.C. airports in the remote areas.

Recommendation 5. That all Transport Canada programs for the installation of facilities and services in the remote areas be structured to permit Regional priority setting in consultation with the provinces and users.

B. Terminal Navaids - Enroute Uses

Conclusion 2. In remote areas, all additional navigation information improves the margin of safety.

Recommendation 6. That in remote are s, NDB's normally installed as terminal aids all be high powered except where frequency problems would result, or where adequate enroute coverage can be provided with a low powered NDB.

C. Air Navigation in British Columbia

Conclusion 3. As a result of unique terrain and aviation requirements, the navaid coverage at low levels in British Columbia is a subject of controversy: Transport Canada officials feel that it is adequate, while the Province does not.

Recommendation 7. That, after adoption of a remote access policy, Transport Canada negotiate a federal-provincial memorandum of understanding similar to that developed in Ontario, and that an action plan outlining the priorities for navaid installation be developed in consultation with the Province and the B.C. aviation council.

Recommendation 8. That, where federal-provincial agreements on aviation facilities are achieved (similar to Ontario), that CATA permit some flexibility in the priority criterion for installation of approach aids.

D. Terminal Navaids - Community Imposed Costs

Conclusion 4. The installation of terminal navaids at remote airfields is primarily intended to aid in the reliability of service to the community.

Recommendation 9. That where a community refuses the use of economical locations for navaid locations, Transport Canada not pay the additional costs for extra roads, power line extensions etc. Unless another agency or level of government is prepared to contribute the extra cost the project should be abandoned.

E. Weather Services

Conclusion 5. Both the collection and dissemination of weather services in remote areas is inadequate for the safe and reliable operations of third level carries.

Recommendation 10. That the weather services study currently under way in DGMS be given high priority, and that the AWORS program be implemented as soon as technically and financially feasible with emphasis on the remote areas currently unserved by any local collection or dissemination of weather.

F. Remote Areas Flight Services Plan

Conclusion 6. Plans to reduce the number of FSS, to add to RCO's, and to move towards AWORS will have a significantly greater impact in remote areas than in developed areas where coverage of facilities is adequate today.

Recommendation 11. That a National Remote Areas Flight Services plan be developed, identifying how integrated communications, weather services, and navaids will be provided in remote areas and identifying priorities for the installation of RCO's, AWOR's, NDB's etc. in these areas. It is also recommended that this plan be developed using a workshop of Headquarters and Regional specialists to ensure a common interpretation of policy and a consensus on the approach and priorities.

G. Alternative Navigation Systems

Conclusion 7. Some operators in remote areas are purchasing and using Loran C and Omega as aids to navigation. There is confusion, however, as to the official status of these navigation systems in Canada.

Recommendation 12. That Transport Canada publish and disseminate its official plans and policy on the use of alternative navigation systems by commercial operators.

H. Year-round Float Plane Services

Conclusion 8. The ability to provide regular year-round air service with float operations to the coastal communities of British Columbia, coupled with terrain which makes the development of land airports a near impossibility in many of these sites, means that float operations will continue to provide the sole means of access to many remote B.C. communities in the foreseeable future.

Recommendation 13. That Transport Canada implement and fund a float plane facilities policy specifically targetted at the remote B.C. coastal communities which would:

(a) cover tidewater sites only (not inland lakes)

(b) be applicable only to communities of over 100 population with no year-round road or rail access.

(c) permit operators wishing to base aircraft at a site to add their own floats to Transport Canada's (but not to use the Transport Canada float as a base).

(d) permit third parties to develop and operate fuel operations adjacent to the Transport Floats at selected sites.

(e) involve total program expenditures of $300,000/year (83/84) for O&M and capital.

(f) involve Transport Canada contracting out all maintenance to DPW.

APPENDIX A

CURRENT STATUS OF SITES ORIGINALLY LISTED AS POSSIBLY NEEDING AVIATION INFRASTRUCTURE IMPROVEMENTS TO RELIEVE ISOLATION

SOURCES OF DATA

Airstrip, Navaids, Lighting	-	VFR Supplement
Unit Toll Traffic	-	DAPF
Population	-	1976 and 1981 Canada Census
Surface Access	-	Canada Gazetteer Atlas

SITE	INDIAN RESERVE	AIRSTRIP	NAVAIDS	LIGHTING	HIGHEST CLASS OF AIR SERVICE	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
LABRADOR									
Marys Harbour		2500'x75' gravel	NDB	-	3	2.1	366	408	Coastal Service
Port Hope Simpson		Scheduled 82-84	NDB sched.	-	3	0.8	548	581	Coastal Service
Cartwright		3500'x75' gravel	NDB	-	3	1.9	675	658	Coastal Service
Rigolet		Scheduled 82-84	-	-	3	0.5	238	271	Coastal Service
Postville		Scheduled 82-84	NDB planned 84-86	-	3	0.5	164	223	Coastal Service
Makkovik		2500'x75' gravel	NDB	-	3	1.1	307	347	Coastal Service
Hopedale		-	-	-	3	0.9	447	425	Coastal Service
Davis Inlet		To be completed 84	-	-	3	1.7	274	240	Coastal Service
Nain		2000'x75' gravel	NDB	-	3	-	812	938	Coastal Service
Red Bay		-	-	-	3	-	301	316	Road/Ferry Serv.
*St. Lewis (Fox Harbour)		Scheduled 84-85	-	-	3	0.6	627	538	Coastal Service
QUEBEC									
*Lourdes de Blanc Sablon (Forteau, Nfld)		4500'x150' gravel	NDB	Threshold/runway	3	7.7	-	602	Road/Ferry Serv.
*St. Augustin		3900'x100' gravel	Private NDB	-	-	2.5	637	586	Coastal Service
*Harrington Harbour (Chevery)						7.3	679	679	Coastal Service
*Natashquan	x	4000'x100' asphalt	NDB (VOR planned 83/84-85/86)	Threshold/runway	2 2	9.7	427	451	Coastal Service
*Blanc	x	5000'x150' asphalt	NDB	Threshold/runway	2	7.0	308	274	Road
George River (Port Nouveau Québec) (Kangiqsualujjuaq)		-	-	-	3	1.1	284	-	
Seal Bay (Baie aux Feuilles) (Tasiujaq)		-	-	-	3	0.9	-	-	Resupply
Koartac		Planned fed. program	-	-	3	1.2	-	-	Resupply
Wakeham Bay (Kangiqsujuaq)		Planned fed. program	-	-	3	1.4	215	229	Resupply
*Deception Bay		-	NDB	-	2	-	-	-	
Saglek (Salbutt)		Planned fed. program	-	-	2	2.7	241	480	Resupply

* Indicates sites that were omitted from 1977 listing of potentially remote sites.

SITE	INDIAN RESERVE	AIRSTRIP	NAVAIDS	LIGHTING	HIGHEST CLASS OF AIR SERVICE	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
QUEBEC (cont'd)									
Ivugivik		Planned fed. program	-	-	2	1.0	-	-	Resupply
Povungnituk		Planned fed. program	NDB	-	2	4.2	-	681	Resupply
*Port Harrison (Inoucdjouac)		2000'x100' sand	-	-	2	3.6	569	661	Resupply
Kuujjvaraplk		5000'x150' gravel	NDB	Runway	-	11.3	454	632	No access
Fort George		Abandoned	-	-	2	6.4	1652	2222	No access
Paint Hills (Wemindji)		2300'x90' gravel	-	-	2	4.1	663	676	No access
Eastmain River	x	1900'x100' sand	-	-	2	2.4	326	328	No access
Rupert House (Ft. Rupert)		2a00'x75' gravel	NDB	-	2	5.1	745	1006	No access
*Fealscamie		-	-	-	4	-	2097	2165	Road-rail
*MistaSsini Post (Baie du Poste)		-	-	-	4	-	5473	6682	Road-rail
*Mat agami		6000'x150' asphalt	NDB	Runway	2	2.5	4023	3794	Road
*Mamobame Reserve	x	-	-	-	-	-	920	960	No access
ONTARIO					-				
Fort Albany	x	3500'x75' gravel	Private NDB (TC NDB planned 83/84/87/88)	Threshold/runway		4.5	483	482	No access
Attawapiskat	x	3500'x100' gravel	NDB	Runway	2	5.0	705	690	No access
Winisk	x	5000'x150' gravel	Private NDB (TC NDB planned 83/84-87/88)	Runway	2	0.8	152	156	No access
Fort Severn	x	3500'x100' sand	Private NDB (TC NDB planned 83/84-87/88)	-	2	1.9	226	264	No access
Webequie		3500'x100' gravel	(TC NDB planned 83/84-87/88)	-	3	2.3	391	406	No access
Landsdowne House		3500'x100' gravel	Private NDB	-	3	1.9	235	-	No access

* Indicates sites that were omitted from 1977 listing of potentially remote sites.

SITE	INDIAN RESERVE	AIRSTRIP	NAVAIDS	LIGHTING	HIGHEST CLASS OF AIR SERVICE	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 19[illegible]	SURFACE ACCESS
ONTARIO (cont'd)									
Kasabonika	x	Under development	-	-	3	-	368	393	No access
Bearskin Lake	x	3600'x100' gravel	-	-	3	-	270	331	No access
*Big Trout Lake	x	3600'x100' gravel	NDB	Runway	3	5.6	821	718	No access
Wunnumin Lake	x		-	-	3	-	256	362	No access
*Ogoki Post		3500'x100' gravel	-	-	3	0.5	-	-	No access
Sachigo Lake	x	3500'x100' gravel	-	-	3	-	134	445	No access
*Sandy Lake	x	3500'x100' gravel	Private NDB (TC NDB planned 83/84-87/88)	Runway	3	7.0	1100	1185	No access
Fort Hope	x	3500'x200' gravel	Private NDB (TC NDB planned 83/84-87/88)	-	3	3.6	621	894	No access
*Red Lake		4000'x150' asphalt	NDB/VOR-DME	Approach/threshold/runway	2	15.3	2264	2120	Road
*Manitouwadge		3400' turf	(TC NDB planned 83/84-87/88)	-	3	-	3551	3183	Road-rail
*Marathon		4500'150' gravel	(VOR planned 83/84-85/86)		-	-	2283	2277	Road-rail
*Geraldton		5000'x100' asphalt	Private NDB (TC NDB planned 83/84-87/88)	Threshold/runway	2	3.3	3127	2956	Road-rail
*Nakina		3800'x75' gravel	NDB	-	3	0.8	620	977	Road-rail

* Indicates sites that were omitted from the 1977 listing of potentially remote sites.

SITE	INDIAN RESERVE	AIRSTRIP	NAVAIDS	LIGHTING	HIGHEST CLASS OF AIR SERVICE	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
MANITOBA									
Shamattawa	x	4140'x100' gravel	Private NDB	Runway	3	1.8	504	519	No access
*God's Lake	x	2560'x75' gravel	Private NDB (TC NDB planned 83/84-87/88)	Runway	3	7.1	746	440	No access
*Island Lake (Wasagamach)	x	3460'x100' gravel	Private NDB (TC NDB planned 83/84-87/88)	Runway	3	-	1599 1330	1781 883	No access
*Red Sucker Lake		3000'x75' gravel	Private NDB	Runway	2	0.6	345	312	No access
*Oxford House	x	3000'x75' gravel	Private NDB	-	2	4.5	985		No access
*St. Theresa Point		3000'x75' gravel	-	-	2	4.6	Within Island Lake		No access
*Norway House	x	3975'x100' gravel	NDB (VOR planned 83/84-85/86)	Runway	2	10.4	1931	1110	No access
*Ilford		3000'x75' gravel	-	-		-	199	-	Rail/road**
*Gillam		5000'x150' gravel	NDB	Threshold/runway	1	10.0	2839	1427	Rail/road**
*Poplar River (Negginan)	x	2200'x50' gravel	-	-	2	-	511	447	No access
*Berens River	x	2500'x75' gravel	Private NDB (TC NDB planned 83/84-87/88)	-	3 2	2.9	899	681	No access
*Little Grand Rapids	x	3000'x75' clay	Private NDB	-	2		510	559	No access
*Missifalls		Community abandoned	-	-	1		-	-	
South Indian Lake		3000'x100' clay	Private NDB	Runway	1	1.5	668	-	No access
*Leaf Rapids		3300'x75' gravel	Private NDB (TC NDB planned 83/84/87/88)	Runway	1	5.4	2067	2356	Road

* Indicates sites that were omitted from the 1977 listing of potentially remote sites.
** Under construction

SITE	INDIAN RESERVE	AIRSTRIP	NAVAIDS	LIGHTING	HIGHEST CLASS OF AIR SERVICE	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
MANITOBA (cont'd)									
Brochet	x	3000'x75' gravel	Private NDB	Runway	3	3.5	525	342	No access
*Nelson House	x	Abandoned	-	-	4	-	1068	761	Road access
*Split Lake	x	Abandoned	-	-	3	-	869	985	Road access
SASKATCHEWAN									
*Uranium City		5000'x200' asphalt	NDB	Approach/threshold/runway	1	17.6	2028	2748	No access
*Wollaston Lake		3800'x75' gravel	NDB	Runway	2	2.3	263	-	No access
*Co-op Point (Kinoosao)		2000' gravel under development	-	-	3	-	-	-	Road
*Southend	x	Served by Pelican Narrows	-	-	4	-	225	318	Road
*Island Falls		-	-	-	-	-	-	-	No access
*Pelican Narrows	x	2856'x75' gravel	-	-	4	-	715	701	Road
*Deschambault Lake		-	-	-	-	-	372	-	No access
*Stanley Mission	x	2800'x75' clay	-	-	-	-	57	-	No access
*Buffalo Narrows		5000'x100' asphalt	NDB	Threshold/runway	3	0.8	837	-	Road
*Ile-a-La-Crosse		3200'x75'gravel	NDB planned	Runway	4	-	821	-	Road
*Pinehouse Lake		3000'x75' gravel	-	Threshold/runway	4	-	528	-	No access
*La Ronge		5000'x150' asphalt	NDB/VOR/DME	Approach/threshold/runway	2	9.1	1714	2579	Road
ALBERTA									
*Fort Chipewyan		5000'x100' asphalt	NDB	Threshold/runway	2	7.3	1179	-	No access
*Fort McMurray		6000'x150' asphalt	NDB/VOR/DME	Approach/threshold/runway	1	126.8	15424	31000	Road
*Fort Vermilion		4000'x100' asphalt	-	Threshold/runway	3	-	729	-	Road
BRITISH COLUMBIA									
*Telegraph Creek		-	-	-	3	-	1210	1593	Road
*Tofino		5000'x100' asphalt	NDB	-	3	3.6	623	705	Road
*Tahsis		Water aerodrome	-	-	3		1663	1739	Road/ferry

* Indicates sites that were omitted from the 1977 listing of potentially remote sites.

SITE	INDIAN RESERVE	AIRSTRIP	NAVAIDS	LIGHTING	HIGHEST CLASS OF AIR SERVICE	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
BRITISH COLUMBIA (cont'd)									
^Bella Coola	x	Water aerodrome + 4000'x100' asphalt	-	-	2	7.0	544	571	Road
^Ocean Falls		Water aerodrome	-	-	2	5.7	985	-	Ferry
^Bella Bella	x	Water aerodrome + 1500'x50' gravel	-	-	2	5.0	862	659	Road/ferry
^Klemtu		Water aerodrome	-	-	2	1.0	71	-	-
^Masset		Water aerodrome	-	-	2	19.2	1612	1569	Road
^Juskatla		Water aerodrome	-	-	2	-	155	-	Road
^Tasu		Water aerodrome	-	-	3	3.4	354	-	Road
^Stewart		3900'x75' asphalt	-	-	2	5.9	1382	1456	Road
^Telegraph Creek	x	5000'x100' gravel	-	-	3	-	300	270	Road
^Dease Lake	x	6000'x100' gravel	-	-	3	-	178	237	Road-rail
^Eddontenajon		3000'x75' gravel	-	-	3	-	178	-	-
^Alice Arm/Kitsault		Water aerodrome	-	-	2	15.9	11	-	-
Germansen Landing		2300'x60' gravel	-	-	-	-	13	-	Road
^Hudson's Hope		5200'x100' asphalt	-	-	3	-	1330	1305	Road

^ Indicates sites that were omitted from the 1977 listing of potentially remote sites.

APPENDIX B

SITES IDENTIFIED AS POTENTIALLY ISOLATED IN 1977 THAT WERE NOT INCLUDED IN THE 1975 LISTING

SOURCES OF DATA

Airstrip, Navaids, Lighting	-	VFR Supplement
Unit Toll Traffic	-	DAPF
Population	-	1976 and 1981 Canada Census
Surface Access	-	Canada Gazetteer Atlas

SITE	INDIAN RESERVE	AIRSTRIP	NAVAIDS	LIGHTING	HIGHEST CLASS OF AIR SERVICE	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
LABRADOR									
Charlottetown		Fed. program 81-85	-	-	-	-	141	-	Marine service
Black Tickle		Fed. program 81-85	-	-	3	0.6	194	-	Marine service
QUEBEC									
Baie Johan-Beetz		-	-	-	2	0.5	168	150	Marine service
Gethsémani		-	-	-	2	1.8	-	-	-
La Tabatière		-	-	-	2	1.3	-	431	No access
Payne Bay (Bellin)		-	-	-	3	1.8	264	-	No access
ONTARIO									
Angling Lake	x	-	-	-	3	-	-	194	No access
Cat Lake	x	-	-	-	3	-	202	328	No access
King Pinder Lake	x	-	-	-	3	-	-	255	No access
North Spirit Lake		-	-	-	3	-	166	-	No access
Poplar Hill		-	-	-	3	-	131	-	No access
Pikangikum	x	3500'x100' gravel	Private NDB (DC NDB (planned)	Threshold/runway	3	1.9	772	979	No access
Deer Lake		3370'x100' gravel	Private NDB	-	3	0.9	-	-	No access

SITE	INDIAN RESERVE	AIRSTRIP	NAVAIDS	LIGHTING	HIGHEST CLASS OF AIR SERVICE	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
MANITOBA									
Bloodvein River	x	3000'x80' gravel	-	-	3	-	416	413	No access
God's River		4000'x100' clay	-	-	3	0.8	198	-	No access
Goose Lake	x	3000'x75' gravel	-	-	3	-	300	311	No access
Paulgansi		-	-	-	3	-	-	-	-
York Landing		2800'x75' gravel	Private NDB	Runway	3	0.7	198	-	No access
SASKATCHEWAN									
Loon Lake		2400'x100' turf	-	-	-	-	365	369	No access
Dillon (Peter Pond Lake)	x	Airstrip - under development	-	-	-	-	374	312	No access
ALBERTA									
Chipewyan Lake		2700'x100' turf	-	-	-	-	147	-	No access
Garden Plain		3000'x50' turf	-	-	-	-	-	-	Rail
Jean D'Or Prairie	x	3000'x50' turf	-	-	3	0.7	326	437	No access
Peerless Lake		-	-	-	-	-	131	-	No access
BRITISH COLUMBIA									
Babine	x	-	-	-	-	-	55	56	No access
Chetwynd		-	-	-	-	-	43	-	Road
Fort Ware	x	3100'x50' gravel	-	-	-	-	166	176	No access
Ingenika Mines		6000'x100' gravel	-	-	-	-	-	-	No access

APPENDIX C

AIRSTRIPS CONSTRUCTED OR IMPROVED AT SMALL OR REMOTE SITES NOT LISTED IN THE 1975 OR 1977 POLICY PAPERS

SOURCES OF DATA

Airstrip, Navaids, Lighting	-	VFR Supplement
Unit Toll Traffic	-	DAPF
Population	-	1976 and 1981 Canada Census
Surface Access	-	Canada Gazetteer Atlas

SITE	INDIAN RESERVE	AIRSTRIP	NAVAIDS	LIGHTING	HIGHEST CLASS OF AIR SERVICE	UNIT POLE TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
LABRADOR									
Paradise River		Fed. program 84-85			1	-	112	-	Marine service
Bonavista		3000'x100' asphalt				-	4299	4460	Road/rail
Port aux Choix		2700'x75' asphalt			1	-	1141	1311	Road
Springdale		2000' gravel			4	-	3513	3501	Road
Harry's-town/Mouse Land		3000'x75' asphalt			9-3		5915	6299	Road
Bell Island		2300'x75' asphalt			-	-	5915	-	Road/Ferry Serv.
QUEBEC									
Chibougamau		6500'x100' asphalt	NDB	approach/threshold/runway	2	8.1	10536	10742	Road/rail
Akulivik		Planned fed. program	-	-	2	1.8	163	236	Resupply
Aupaluk		Planned fed. program	-	-	3	1.2	-	102	No access
Port Nouveau Quebec (Kangiqsualujjuaq)		Planned fed. program	-	-	-	-	285	149	No access
St. Honoré		6000'x150' asphalt	pvt NDB	threshold/runway	4	-	906	845	Road
Port Menier		4200'x100' gravel	NDB	runway	2	2.0	266	-	Local road
Bonaventure		6000'x150' asphalt	NDB	threshold/runway	4	4.8	2895	2950	Road/rail

SITE	INDIAN RESERVE	AIRSTRIP	NAVAIDS	LIGHTING	HIGHEST CLASS OF AIR SERVICE	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
ONTARIO									
Pickle Lake		4500'x100' asphalt	NDB	Threshold/runway	2	1.9	508	552	Road
Armstrong		3700'x150' asphalt	NDB	-	3	-	1444	1442	Road/rail
Kashechewan	x	3500'x100' gravel	-	Threshold/runway	-	3.5	981	-	No access
SASKATCHEWAN									
Pelican (Kapachewanak)	x	3000'x75' gravel	-	-	-	-	332	356	No access
ALBERTA									
Bonnyville		3000'x75' paved	NDB	Threshold/runway	7	-	2948	4454	Road/rail
Brooks		2800'x75' paved	-	Threshold/runway	4	-	6387	9421	Road/rail
Consort[A]		3000'x75' paved	-	Threshold/runway	7	-	609	632	Road/rail
Hardisty[A]		3000'x75' paved	-	Threshold/runway	4	-	540	641	Road/rail
Provost		2800'x75' paved	NDB	Threshold/runway	-	-	1532	1645	Road/rail
Stettler		3000'x75' paved	-	Threshold/runway	-	-	4188	5136	Road/rail
Three Hills		3000'x75' paved	-	Threshold/runway	-	-	1569	1787	Road/rail
Wainwright		3500'x75' paved	-	Threshold/runway	4	-	3895	4266	Road/rail
Westlock[A]		3000'x75' paved	-	Threshold/runway	7	-	3726	4424	Road/rail
Cadotte Lake[AA]		4500'x100' gravel	-	-	-	-	135	-	No access
Janvier[AA]	x	4500'x100' gravel	-	-	-	-	245	162	No access

[A] New airports constructed under Alberta provincial programs.
[AA] Northern airstrips constructed to relieve isolation.

SITE	INDIAN RESERVE	AIRSTRIP	NAVAIDS	LIGHTING	HIGHEST CLASS OF AIR SERVICE	UNIT TOLL TRAFFIC	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
ALBERTA (cont'd)									
Athabaska[A]		3000'x75' asphalt	NDB	Threshold/runway	4	-	1851	1731	Road/rail
Beaverlodge[A]		3000'x75' gravel	-	-	-	-	1371	1937	Road/rail
Bow Island[A]		3000'x75' asphalt	-	Threshold/runway	4	-	1296	1491	Road/rail
Cardston[A]		3500'x75' asphalt	-	Threshold/runway	-	-	3063	3267	Road/rail
Fairview		3000'x75' asphalt	-	Threshold/runway	4	-	2273	2869	Road/rail
High Prairie[A]		3000'x75' asphalt	NDB	Threshold/runway	4	-	2364	2506	Road/rail
Lacombe		3000'x75' asphalt	-	-	-	-	5034	5591	Road/rail
Oyen		3000'x75' asphalt	NDB	Threshold/runway	4	-	962	973	Road/rail
Fox Creek[AA]		4000'x150' gravel	-	Threshold/runway	-	-	1625	1978	Road
Hanna		3000'x75' asphalt	-	Threshold/runway	-	-	2627	2806	Road/rail
Coronation		3000'x75' asphalt	-	Threshold/runway	-	-	1198	1390	Road/rail
Ft. MacLeod		3000'x75' asphalt	-	Threshold/runway	-	-	3067	3139	Road/rail
Milk River[A]		2950'x75' gravel	-	Threshold	4	-	815	896	Road/rail
Ponoka		4100'x75' asphalt		Threshold/runway	4	-	6807	7503	Road/rail
Spirit River		3000'x75' asphalt		Threshold/runway	-	-	1020	1104	Road/rail
St. Paul		3500'x100' asphalt	NDB	Threshold/runway	-	-	5351	6886	Road/rail
Two Hills[A]		2900'x75' asphalt	-	Threshold/runway	-	-	953	1193	Road/rail
Valleyview[A]		3000'x75' asphalt	-	Threshold/runway	-	-	1716	2061	Road
Manyberries[A]		2900'x75' asphalt	-	Threshold/runway	-	-	636	677	Road/rail
Camrose		3500'x100' asphalt	-	Threshold/runway	4	3.4	10104	12570	Road/rail
Rainbow Lake		4500'x75' asphalt	NDB	Threshold/runway	2		436	504	No access
Graham Lake[AA]		3000'x75' turf	-	-			-	-	
Cold Lake/ Grand Centre[A]		3000'x75' asphalt	-	Runway	2	-	2800	3146	Road/rail
Taber		3000'x75' asphalt	-	Threshold/runway	4	-	5296	5983	Road/rail
Drayton Valley		3900'x75' asphalt	NDB	Threshold/runway	-	-	4378	5062	Road
Fort Vermont[A]		3000'x75' asphalt		Threshold/runway	-	-	536	568	Road/rail
Hayerthorpe[A]		2900'x75' asphalt	-	Threshold/runway	-	-	1013	1475	Road/rail
Viking[A]		2950'x75' asphalt	-	Threshold/runway	-	-	1217	1232	Road/rail

[A] New airports constructed under Alberta provincial programs.
[AA] Northern airstrips constructed to relieve isolation.

SITE	INDIAN RESERVE	AIRSTRIP	NAVAIDS	LIGHTING	HIGHEST CLASS OF AIR SERVICE	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
BRITISH COLUMBIA									
Anaheim Lake		3340'x75' asphalt	-	-	-	-	1000	-	Road
Port McNeill		2000'x50' gravel	-	-	3	-	1480	2474	Road/ferry
Tahsish Inlet	x	Water aerodrome	-	-	-	-	-	-	No access
Texada Island		2500'x75' gravel	-	-	-	-	-	-	Ferry
Powell River		3760'x150' asphalt	-	Threshold/runway	2	50.8	13694	13423	Ferry/road
Parksville/Qualicum		2900'x75' asphalt	-	-	3	-	3420	5216	Road/rail
Ladysmith		Water aerodrome	-	-	-	-	4004	4558	Road/rail
Gibsons		2400'x75' asphalt	-	-	-	-	2078	2594	Ferry/road
Squamish		2400'x75' asphalt	-	-	4	-	8368	10277	Road/rail
Pemberton		3000'x75' turf	-	-	4	-	301	282	Road/rail
Atlin		3600'x200' gravel			4		250	-	Road
Black Lake*		?			-		-	-	No access
Dease Lake*	x	4100'x40' gravel	-	-	-	-	203	255	Rail
Houston Lake		3000'x75' gravel	-	-	4	-	2673	3921	Road/rail
Burns Lake		5000'x75' asphalt	-	-	3	-	1435	1777	Road/rail
Fraser Lake		Water aerodrome			-	-	1430	1543	Road/rail
Ft. St. James*		2800'x75' asphalt	-	-	4	-	2110	2284	Road
Vanderhoof		3950'x75' asphalt	-	-	4	-	2063	2323	Road/rail
Mackenzie*		5000'x100' asphalt	-	Threshold/runway	3	-	5388	5890	Road/rail
Chetwynd		4500'x75' asphalt	-	Threshold/runway	4	-	1733	2553	Road/rail
Dawson Creek		5000'x150' asphalt	NDB	Approach/threshold/runway	-	73.2	10528	11373	Road/rail
Lac La Hache		?	-	-	-	-	333	-	Road
McBride		2700'x75' asphalt	-	-	-	-	619	641	Road/rail
Lillooet		3990'x75' asphalt	-	-	-	-	1614	1725	Road/rail
Chilliwack		2500'x75' asphalt	-	Threshold/runway	3	1.7	36939	40642	Road/rail
Harrison		?			-	-	572	569	Road
Merritt		4000'x75' asphalt	-	-	-	-	5680	6110	Road/rail

* Northern airstrips constructed to relieve isolation.

SITE	INDIAN RESERVE	AIRSTRIP	NAVAIDS	LIGHTING	HIGHEST CLASS OF AIR SERVICE	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
BRITISH COLUMBIA (cont'd)									
Princeton		3934'x75' asphalt	NDB	-	-	-	3130	3051	Road/rail
Osoyoos		?			-	-	2251	2738	Road/rail
Salmon Arm		3990'x75' asphalt	-	-	4	-	9391	10780	Road/rail
Grand Forks		4300'x75' asphalt	NDB	-	-	0.7	3096	3486	Road/rail
Roasland		?			-	-	3716	3967	Road/rail
Nelson		2900'x75' asphalt	-	-	2	-	9235	9143	Road/rail
Creston		3945'x75' asphalt	-	-	-	-	4227	4190	Road/rail
Sparwood (Elk Valley)		3500'x75' turf	-	-	4	-	4050	4157	Road/rail
Golden		4000'x75' asphalt	-	-	4	-	3282	3476	Road/rail
Revelstoke		4500'x75' asphalt	-	-	4	-	4648	5544	Road/rail
Blue River	x	5000'x60' asphalt	-	-	-	-	425	-	Road/rail
Valemount		2200'x75' gravel	-	-	4	-	878	1130	Road/rail

APPENDIX D

SITES WITH CLASS 3 SERVICE WHICH WERE NOT IDENTIFIED
AS POTENTIALLY ISOLATED IN 1975 OR 1977
(MAJOR POPULATION CENTRES EXCLUDED)

SOURCES OF DATA

Airstrip, Navaids, Lighting	-	VFR Supplement
Unit Toll Traffic	-	DAPF
Population	-	1976 and 1981 Canada Census
Surface Access	-	Canada Gazetteer Atlas

SITES WITH CLASS 3 SERVICE

SITE	AIRSTRIP	NAVAIDS	LIGHTING	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
Alert Bay, B.C.	2500'x75' asphalt	NDB	-		605	626	Ferry
Alma, P.Q.	4300'x150' asphalt+gravel	NDB	Threshold/runway	2.1	25638	26322	Rail/road
Amos, P.Q.	5000'x75' asphalt	NDB	Threshold/runway		9213	9421	Rail/road
Arnes, Man.	2500'x80' turf	-	-		-	-	Rail/road
Arran Rapids, B.C.	-	-	-	3.5	5803	4452	Rail/road
Asbestos Hill, P.Q.	3000'x150' gravel	-	-		-	-	-
Atikokan, Ont.	3500'x100' asphalt	NDB	Threshold/runway	4.9	9113	7967	Road/rail
Barr Creek, B.C.	-	-	-	-	-	-	-
Bear Creek, B.C.	-	-	-	-	6	-	-
Bear Island, Ont.*	-	-	-	-	111	139	-
Beaver Cove, B.C.	-	-	-	-	-	-	Road
Bedwell Harbour, B.C.	-	-	-	-	-	-	-
Big Bay, B.C.	-	-	-	-	39	-	-
Big Black River, Man.	-	-	-	-	51	-	-
Bird, Man.	2000'x100' (abandoned)	-	-	-	36	-	Rail
Blind Bay, B.C.	-	-	-	-	156	-	Road
Blind Channel, B.C.	-	-	-	-	15	-	-
Blowhole Bay, B.C.	-	-	-	-	-	-	-
Bob Quinn Lake, B.C.	-	-	-		-	-	-
Bonaventure, P.Q.	6000'x150' asphalt	NDB	Runway/threshold	4.8	2895	2950	Road/rail
Boswell, B.C.	-	-	-	-	23	-	Road
Boughey Bay, B.C.	-	-	-	-	-	-	-
Boundary Falls, B.C.	-	-	-	-	-	-	Road
Brem River, B.C.	-	-	-	-	-	-	-
Burns Lake, B.C.	5000'x75' asphalt	-	-	-	1433	1777	Road/rail
Butedale, B.C.	-	-	-	-	3	-	-
Camachigama Lake, P.Q.	-	-	-	-	-	-	-
Camsell Portage, Sask.	2300'x75' gravel	-	-	-	50	-	-

* Indian Reservation

SITE	AIRSTRIP	NAVAIDS	LIGHTING	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
Caution Cape, B.C.	-	-	-	-	-	-	-
Ceepeecee, B.C.	-	-	-	-	1	-	-
Chamiss Bay (Kyuquot Log), B.C.	-	-	-	-	3	-	-
Change Island, Nfld.	-	-	-	-	535	580	-
Chapleau, Ont.	4000'x100' asphalt	NDB	RWY, APP, Thres.	2.8	3294	3243	Road/rail
Charlevoix/Murray Bay, P.Q.	4500'x150' asphalt	NDB	RWY, APP, Thres.	-	134	-	-
Charlotte Lake, B.C.	3900'x50' gravel	-	-	-	-	-	Road
Chilko Lake, B.C.*	2500'x50' gravel	-	-	-	39	43	Road
Church House, B.C.	-	-	-	-	-	-	-
Clowhom Falls, B.C.	-	-	-	1.2	-	-	-
Cluff Lake, Sask.	4800'x150' gravel	NDB	RWY, Threshold	0.7	-	-	-
Cochrane, Ont.	3500'x100' asphalt	NDB	RWY, Threshold	0.8	4990	4848	Road/rail
Collins Bay, B.C.	-	-	-	-	-	-	-
Cortes Bay, B.C.	-	-	-	-	55	-	Ferry
Crawfish Lake, B.C.	-			-	-	-	-
Cross Lake, Man.*	3000'x100' gravel	NDB	RWY (Temporary)	3.6	1983	1567	-
Cypre River, B.C.	-	-	-	-	-	-	-
Daniels River, B.C.	-	-	-	0.6	-	-	-
Dawsons Landing, B.C.	-	-	-	-	8	-	-
Genesee River, B.C.	-	-	-	-	-	-	-
Deserted Bay, B.C.	-	-	-	0.6	-	-	-
Dinan Bay, B.C.	-	-	-	1.7	-	-	-
Dolbeau, P.Q.	5600'x150' gravel	-	RWY, Threshold	-	8451	8766	Rail/road
Duncan/Quamichan Lake, B.C.	1600'x75' gravel	-	-	4.4	4106	4228	Road/rail

* Indian Reservation

SITE	AIRSTRIP	NAVAIDS	LIGHTING	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
Duncanby Landing, B.C.	-	-	-	-	1	-	-
Ear Falls, Ont.	4000'x100' asphalt	NDB	RWY, Approach, Threshold	-	1982	2028	Road/rail
East West Bay, B.C.	-	-	-	-	-	-	-
Easterville, Man.	2999'x100' gravel	-	Temp./port.	-	565	-	Road
Echo Bay, B.C.	-	-	-	-	1	-	-
Edson, Alta	6000'x100' asphalt	NDB	RWY, Threshold	-	4058	5835	Road/rail
Egmont, B.C.	-	-	-	-	83	-	Road
Elk Island, Man.	3500'x100' clay	-	-	-	-	-	-
Esperanza, B.C.	-	-	-	-	5	-	Ferry
Espinoza Inlet, B.C.	-	-	-	-	-	-	-
Eva Creek, B.C.	-	-	-	-	-	-	-
Fair Harbour, B.C.	-	-	-	-	-	-	-
Finn Bay, B.C.	-	-	-	-	-	-	-
Flower's Cove, Nfld.	-	-	-	-	436	459	Road
Fogo, Nfld.	-	-	-	0.9	1103	1105	Ferry/road
Fond-du-Lac, Sask.*	3000'x75' gravel	-	-	1.8	452	494	-
Forestville, P.Q.	6000'x150' asphalt	NDB	RWY, Threshold	0.8	4358	4271	Road
Fort Vermillion, Alta.	-	-	-	-	-	-	-
Fox Lake, Alta. *	4500'x100' turf	-	-	1.0	482	634	-
Friendly Cove, B.C.	-	-	-	-	-	-	Ferry
Galiano, B.C. *	-	-	-	-	480	-	Ferry
Ganges, B.C.	-	-	-	1.7	444	-	Ferry
George Harbour, B.C.	-	-	-	-	-	-	-
Gilford Island, B.C.	-	-	-	-	-	-	-
Village, B.C.							
Gillies Bay, B.C.	2500'x75' gravel	-	-	-	560	-	Ferry
Glendale Cove, B.C.	-	-	-	-	-	-	-
God's Lake Narrows, Man.	2500'x75' gravel & clay	NDB(PVT)	Boundary	7.1	-	-	-
Good Hope, B.C.	-	-	-	-	-	-	-
Goose Bay, B.C.	-	-	-	-	-	-	-

* Indian Reservation.

SITE	AIRSTRIP	NAVAIDS	LIGHTING	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
Greens Cove, B.C.	-	-	-	-	-	-	Ferry
Harbledown Island, B.C.	-	-	-	-	-	-	-
Harbour Deep, Nfld.	-	-	-	-	-	-	Coastal serv.
Hartley Bay, B.C.	-	-	-	-	-	-	-
Hauterive, P.Q.	-	-	-	-	14724	13995	Road
Head Knight Inlet, B.C.	-	-	-	-	-	-	-
Hearst, Ont.	3500'x100' asphalt	NDB	RWY, Threshold		5195	5533	Road/rail
Hecate Bay, B.C.	-	-	-	-	-	-	-
Hinton, Alta.	4500'x100' asphalt	NDB	RWY, Threshold		6731	8342	Road/rail
Homathko River, B.C.	-	-	-	-	-	-	-
Hornepayne, Ont.	3500'x75' asphalt	NDB	RWY, Approach, Threshold	2.9	1694	-	Road/rail
Hotsprings Bay, B.C.	-	-	-	-	-	-	-
Hudson's Hope, B.C.	5200'x100' asphalt	-	-	-	1330	1365	Road
Humpback Bay, B.C.	-	-	-	-	-	-	-
Hunts Inlet, B.C.	-	-	-	-	7	-	-
Ignace, Ont.	3000'x75' gravel	-	-	-	1983	2499	Rail/road
Ile-aux-Grives, P.Q.	-	-	-	-	-	-	-
Invermere, B.C.	3000'x75' asphalt	-	-	-	1652	1969	Road/rail
Jackson Flats, B.C.	-	-	-	-	-	-	-
Jennis Bay, B.C.	-	-	-	-	-	-	-
Jenpeg, Man.	3250'x100' gravel	PVT NDB	RWY	0.5	338	-	Ferry
Kegashaka, P.Q.	-	-	-	-	152	-	-
Kelsey Bay, B.C.	-	-	-	-	17	-	Road
Kelsey, Man.	2000'x75' gravel	-	Temp.	0.6	-	-	Rail
Kemano, B.C.	-	-	-	0.7	263	-	Ferry
Key Lake, Sask.	5200'x180' gravel	NDB	RWY	-	-	-	-
Kilbella Bay, B.C.	-	-	-	0.6	-	-	-
Kimberley, B.C.	-	-	-	-	7111	7375	Road/rail
Kimsquit, B.C.	-	-	-	-	-	-	-
Kincolith, B.C.*	-	-	-	1.7	380	337	-

* Indian Reservation

SITE	AIRSTRIP	NAVAIDS	LIGHTING	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
Kingcome Inlet, B.C.	-	-	-	0.9	-	-	-
Kitkatla, B.C.	-	-	-	2.8	-	-	-
Kitsault Village, B.C.**	-	-	-	15.9	6	-	-
Klemtu, B.C.	-	-	-	-	-	-	-
Kluayaz Lake, B.C.	-	-	-	-	-	-	-
Kotcho Lake, B.C.	-	-	-	-	-	-	-
Kyuquot, B.C.	-	-	-	0.6	37	-	-
L'Anse-au-Loup, Nfld.	-	-	-	-	536	589	Ferry/road
La Sarre, P.Q.	4700'x150' gravel	-	-	-	8249	8861	Rail/road
La Tuque, P.Q.	6000'x200' asphalt	NDB	RWY	-	12067	11556	Rail/road
Labrador, Nfld.	6000'x150' asphalt	-	RWY, Approach, Threshold	-	12012	11583	Road/rail
Lac des Loups, P.Q.	6000'x200' asphalt	-	-	-	153	-	Road
Lac Brochet, Man.	3480'x100' gravel	-	Temp.	2.0	216	-	-
Louise Island, B.C.	-	-	-	1.3	-	-	-
Lyell Island, B.C.	-	-	-	-	-	-	-
Machmell River, B.C.	-	-	-	-	-	-	-
Mahatta River/Cleagh Creek, B.C.	-	-	-	-	129	-	-
Mahood Log (Goat Lake) B.C.	-	-	-	-	-	-	-
Malibu Peninsula, B.C.	-	-	-	-	4	-	-
Manson's Landing, B.C.	-	-	-	-	90	-	-
Mayne, B.C.*	-	-	-	-	-	-	Ferry
Meadow Lake, Sask.	5000'x100' asphalt 2100'x750' asphalt	NDB	RWY, Approach, Threshold	0.6	3666	3857	Road/rail
Minstrel Island, B.C.	-	-	-	-	30	-	-
Moh Creek, B.C.	-	-	-	-	-	-	-

* Indian Reservation
** Class 2 service

SITE	AIRSTRIP	NAVAIDS	LIGHTING	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
Montmagny, P.Q.	3000'x100' gravel	-	Temporary	3.4	13326	12405	Road/rail
Moose Lake, Man.*	3000'x75' gravel	-	-	-	300	311	-
Moses Inlet, B.C.	-	-	-	1.3	-	-	-
Muchalat River, B.C.	-	-	-	-	-	-	-
Munsenlog (Channel Point), B.C.	-	-	-	-	-	-	-
Muskrat Dam, Ont. *	-	-	-	-	-	-	-
Nootka, B.C.	-	-	-	-	-	-	-
North Battleford, Sask.	5000'x150' asphalt	NDB	RWY, Threshold	-	13158	14030	Road/rail
North Sewell, B.C.	-	-	-	-	-	-	-
Nuchalitz, B.C.	-	-	-	-	-	-	-
One Eye, B.C.	-	-	-	-	-	-	-
Oona River, B.C.	-	-	-	-	46	-	-
Orford Bay, B.C. *	-	-	-	-	-	-	-
Osnaburgh House, Ont.*	-	-	-	-	333	700	Road
O'Sullivan Lake, P.Q.	-	-	-	-	-	-	-
Ououkinish, B.C.*	-	-	-	-	-	-	-
Owikeno Lake, B.C.	-	-	-	-	-	-	-
Pacific Oyster, B.C.	-	-	-	-	-	-	-
Parent, P.Q.	3400'x60' gravel	-	-	-	392	439	Rail
Phillips Arm, B.C.	-	-	-	1.3	72	-	-
Pikwitonei, Man.	2200'x75'	-	Temporary	-	202	-	Rail
Pine Falls, Man.	-	-	-	-	945	-	Rail/road
Port Alberni, B.C.	2100'x150' turf	-	-	1.3	20044	19892	Road/rail/ferry
Port Clements, B.C.	-	-	-	-	409	380	Road
Port Douglas, B.C.	-	-	-	-	-	-	-
Port Harrison, B.C.	-	-	-	-	-	-	-
Port Harvey, B.C.	-	-	-	-	-	-	-
Port McNeill, B.C.	2000'x50' gravel	-	-	-	1480	2474	Road/ferry
Port Neville, B.C.	-	-	-	-	26	-	-
Port Simpson, B.C.*	-	-	-	12.7	836	856	-
Port-Cartier, P.Q.	4600'x200' sand	-	RWY, Threshold	3.9	8139	8191	Road

* Indian Reservation

SITE	AIRSTRIP	NAVAIDS	LIGHTING	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
Pukatawagan, Man.*	2900'x90' gravel	NDB	RWY, Threshold	0.9	821	449	Rail
Puntzi, B.C.*	6000'x250' asphalt	-	-	-	-	10	Road
Qualicum, B.C.	2900'x75' asphalt & gravel	-	-	-	42	44	Road/rail
Quatam River, B.C.	-	-	-	-	-	-	-
Queen Charlotte City, B.C.	-	-	-	6.7	727	-	-
Queen's Cove, B.C.	-	-	-	-	-	-	-
R.I.C. Cannery, B.C.	-	-	-	-	-	-	-
Rabbit Lake, Sask.	-	-	-	-	166	159	Road/rail
Rainbow Creek, B.C.	-	-	-	-	-	-	-
Redonda Bay, B.C.	-	-	-	-	-	-	-
Refuge Cove, B.C. *	-	-	-	-	23	56	-
Rennel Sound, B.C.	-	-	-	-	-	-	-
Rivers Inlet, B.C.	-	-	-	-	23	-	-
Roberval, P.Q.	5000'x150' asphalt	NDB	RWY, Threshold	2.0	10529	11429	Rail/road
Rock Bay, B.C.	-	-	-	-	9	-	Road
Round Lake, Ont.	3500'x100' gravel	NDB	RWY, Threshold	2.6	-	-	Road
Ruttan Lake, Man.	-	-	-	-	-	-	Road
Sainte-Anne-des-Monts, P.Q.	3600'x75' gravel	-	-	-	5945	6062	Road
Sandy Lake, Ont.*	3500'x100' gravel	Private NDB TC NDB 83	RWY	7.0	1100	1185	-
Sans-Souci, Ont.	-	-	-	-	16	-	-
Savage Island, Man.	-	-	-	-	-	-	-
Savary Island, B.C.	-	-	-	-	21	-	-
Scar Creek, B.C.	-	-	-	-	-	-	-
Scud River, B.C. (Anuk River)	-	-	-	-	-	-	-
Seal Cove, B.C.	-	-	-	-	-	-	Road
Sechelt Creek, B.C.	-	-	-	11.4	822	1096	Road
Seekelt, B.C.	-	-	-	-	-	-	-

SITE	AIRSTRIP	NAVAIDS	LIGHTING	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
Sheemahant River, B.C.	-	-	-	-	-	-	-
Shoal Bay, B.C.	-	-	-	-	-	-	-
Shoal Harbour, B.C.	-	-	-	0.8	-	-	-
Silvery River, B.C.	-	-	-	0.5	-	-	-
Sim Creek, B.C. *	-	-	-	-	-	-	-
Simoom Sound, B.C.	-	-	-	-	56	-	-
Slave Lake, Alta.	5000'x100' asphalt	NDB	RWY, Threshold	-	3561	4506	Road/rail
Smithers, B.C.	5000'x150' asphalt	NDB	RWY, Approach, Threshold	-	3797	4570	Road/rail
Snout Point, B.C.	-	-	-	-	-	-	-
Sointula, B.C.	-	-	-	-	546	-	Road/ferry
South Bentinck Arm, B.C.	-	-	-	-	-	-	-
South Sewell, B.C.	-	-	-	-	-	-	-
Southgate River, B.C.	-	-	-	-	-	-	-
Square Islands, Nfld.	-	-	-	-	85	-	Coastal serv.
Squirrel Cove, B.C.*	-	-	-	-	27	-	-
St. Anthony, Nfld.	3000'x100' asphalt	-	RWY, Approach	6.1	2987	3107	Road
Steinbach, Man.	3000'x100' turf & gravel	-	RWY, Treshold	-	6265	6676	Road
Stokke Creek, B.C.	-	-	-	-	-	-	-
Stony Rapids, Sask.	4400'x100' gravel	NDB	RWY, Threshold	4.1	526	-	-
Stopford Bay, B.C.	-	-	-	-	-	-	-
Strasond Lake, P.Q.	-	-	-	-	-	-	-
Stuart Island, B.C.	-	-	-	-	15	-	-
Sullivan Bay, B.C.	-	-	-	-	2	-	-
Summer Beaver, Ont.	-	-	-	0.8	-	-	-
Surge Narrows, B.C.	-	-	-	-	10	-	-
Swan River, Man.	2500'x75' asphalt	PVT NDB	RWY, Threshold	1.7	3742	3782	Road/rail
Tatla Lake, B.C.	4160'x40' gravel	-	-	-	24	-	Road
Teakerne Arm, B.C.	-	-	-	-	-	-	-
Temagami, Ont.	-	-	-	-	1327	1224	Road/rail
Terrace Bay, Ont.	4994'x100' asphalt	PVT NDB	RWY, Approach, Threshold	1.3	2098	2644	Road/rail

* Indian Reservation

SITE	AIRSTRIP	NAVAIDS	LIGHTING	UNIT TOLL TRAFFIC (1980) '000	POPULATION 1976	POPULATION 1981	SURFACE ACCESS
Thicket Portage, Man.	2300'x75' clay	-	Temporary	-	255	-	Rail
Thompson Sound, B.C.	-	-	-	-	69	-	-
Thurston Bay, B.C.	-	-	-	-	-	-	-
Thurston Harbour, B.C.	-	-	-	-	42	-	-
Tipella, B.C.*	-	-	-	1.1	-	-	Road
Toba, B.C.	-	-	-	0.7	-	-	-
Tofino, B.C.	5000'x100' asphalt	NDB	-	-	623	705	Road
Twillingate, Nfld.	-	-	-	-	1404	1506	Road
Wadhams, B.C.	-	-	-	-	-	-	-
Wakeman Sound, B.C.	-	-	-	1.0	-	-	-
Waldons Mill, B.C.	-	-	-	-	-	-	-
Warner Bay, B.C.	-	-	-	-	-	-	-
Watson Lake, B.C.	-	-	-	-	-	-	-
Wawa, Ont.	3935'x90' asphalt	PVT NDB	RWY, Threshold	4.9	4272	-	Road/rail
Weewarnee River, B.C.	-	-	-	-	-	-	-
Weldwood, No. 1, B.C.	-	-	-	-	-	-	-
Wellbore Channel, B.C.	-	-	-	0.5	-	-	-
West St. Modeste, Nfld.	-	-	-	-	277	273	Ferry
Whaletown, B.C.	-	-	-	-	44	-	-
Williston Lake, B.C.	-	-	-	-	-	-	Road/rail
Woss Lake, B.C.	3300' gravel	-	-	-	408	-	Road
Zeballos, B.C.	-	-	-	0.5	337	329	Road/ferry

APPENDIX E

NOTES RESPECTING THE CONCERNS OF BRITISH COLUMBIA WITH THE AIR NAVIGATION SYSTEM

Transport Policy Analysis Branch
B.C. Ministry of Transportation & Highways
March 1983

The British Columbia economy is dominated by resource industries such as forestry, mining, oil and gas development and fisheries. Manufacturing, trade and service centres derive a substantial portion of their business from resource industry spinoffs. Often far-flung and remote, heavy demands are placed on aviation in serving the needs of these activities, either because other modes are not available or too slow in relation to the distance travelled. Air Transportation plays a very important role.

The demands on the aviation infrastructure along with the physical impediments imposed by geography makes ongoing improvements essential for all air facilities, and in particular, the system of approach and enroute aids to navigation. Terrain and unpredictable extremes of weather create greater dependance on air transport and also make this mode more hazardous than in many other regions of the country thus requiring a relatively greater proportion of aviation support facilities to attain the same standard of reliability and safety.

A great many commercial air services in the Province are provided by local and sub-regional air carriers who are limited to flying regularly at low altitudes in a less than hospitable environment, often on routes ill served by navigation and communication aids. Although sub-regional carriers do not carry the bulk of passengers on a province-wide basis, many of the areas where such services are vital are least well served by the present air navigation system. This is especially true along the west coast and in the northern interior. It should be noted that there are vast areas of the Province served by no IFR airports at all, and other large areas where an IFR airport is so isolated as to make planning for a safe alternate nearly impossible, given the operating limitations of aircraft available to sub-regional carriers.

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In general, the present air navigation system in the Province is deployed to serve the principal population centres where Class 1 commercial jet transport service is provided. Unfortunately sub-regional and local commercial services, and many air ambulance and air tanker missions, often take place in areas and with aircraft that do not allow them to take advantage of that system.

Aviation has always been in the forefront of exploration and development in British Columbia and must have additional navigation aids available before they would otherwise appear to be justified by the traditional evidence of regular users. In an effort to meet this requirement for installation of strategic navigation facilities, the Air Transport Assistance Program of the Province of British Columbia provided funds to three communities for the installation of non-directional beacons. Unfortunately these projects and others have been delayed due to uncertainties surrounding the licensing of non-federally owned public-use navigation facilities. The Province remains willing to consider further funding of non-directional beacons should these difficulties be resolved. However the Province remains deeply concerned that the existing federal enroute aids system is not able to provide airway access to provincially funded approach facilities. Without this access small carriers and other operators cannot justify upgrading their aircraft, nor is it practical for the Province to fund airport improvements that may otherwise be justified.

Provincial concerns about the state of the air navigation in British Columbia can be summed up in three main points which were made to the Dubin Commission of Inquiry into Aviation Safety in Canada. These points are:

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1) The present enroute navigation and communication system coverage is principally designed to serve high altitude, high performance aircraft.

2) The present system with its shortcomings as to coverage and reliability are partially reflected in a higher enroute accident rate in Britisn Columbia.

3) Transport Canada's ability to implement plans for improvement and expansion of the air navigation system in the Province appears to be severely constrained by a lack of adequate funding.

Despite difficulties caused by remote power supplies, terrain barriers and weather interference, navigation aids are essential to the safe operation and growth of the British Columbia aviation industry and the British Columbia economy. It seems unreasonable that a "maintenance only" budget for the ANS sector is all that can currently be provided to the Pacific Region Transport Canada. This budget level prevents the Region from following through with repeated recommendations contained in PRAAMP and other planning documents, let alone address strategic requirements identified by the Region and by the Province.

Requirement for a Strategic ANS Policy

Transport Canada's existing policy for the establishment of new airways and navaids requires that the justification for establishing VOR airways must be based on a positive operational requirement, which in turn can only arise when

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there is a heavy continuing movement of VOR equipped aircraft between two locations. In general the existing policy requires an average of six scheduled flights per day or twenty-five scheduled flights per week by an established air carrier and there is an average of ten movements per day or forty movements per week by a non-scheduled executive or itinerant VOR equipped aircraft. Under the policy, even if these criteria can be met or exceeded, there is no guarantee that funding will be provided since the policy also requires the investigation and consideration of siting, installation and operational costs which, as has been noted in the previous section, can be extremely high in the Province of British Columbia.

As a direct result of this sort of policy we have seen little or no growth in the air navigation system in British Columbia over the past decade.

It is of paramount importance that an alternate criteria for the establishment of new air navigation facilities be introduced on the basis of strategic importance to remote and/or developing areas of the Province. In areas of British Columbia where no navigation facilities presently exist, existing third level air carriers on low density routes are providing vital access to isolated areas of British Columbia in support of the provincial resource based economy. This is particularly true in such areas as north-western B.C. where new hydro electric, mining and other resource projects are under active consideration. A key example of provincial interest in this area is the new 6000' airstrip at Dease Lake, currently under development in order

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to permit air access to the northwest B.C. area. The Province expects that Dease Lake may become a major service and distribution point for air transportation activities, in support of resource exploration and development.

From the attached map, it can readily be seen that Dease Lake is in the middle of a huge area of the Province which is completely devoid of navigation facilities. Even if an approach aid was installed at Dease Lake, it would be useless owing to the lack of a suitable enroute ANS infrastructure.

Another key location for the establishment of a new strategic navaid and extension of the existing air navigation system is in the area of Anahim Lake. Again referring to the attached map, it will be noted that Anahim Lake is near the centre of another vast area devoid of air navigation system coverage. This presents a problem in providing reliable access by scheduled, charter and air ambulance services in the area, and creates another equally important difficulty for other aircraft.

At the present time, aircraft operating under instrument flight conditions travelling from the Lower Mainland to the Smithers, Terrace or Prince Rupert areas must travel a circuitous (and costly) route by way of either Williams Lake or Port Hardy. This is a serious restraint to the provision of third level air carrier services between the two areas and adds a substantial amount of travel time to air ambulance operations. The establishment of a new VOR in the Anahim Lake area could provide the means for direct air routing between the Lower Mainland and northern regions.

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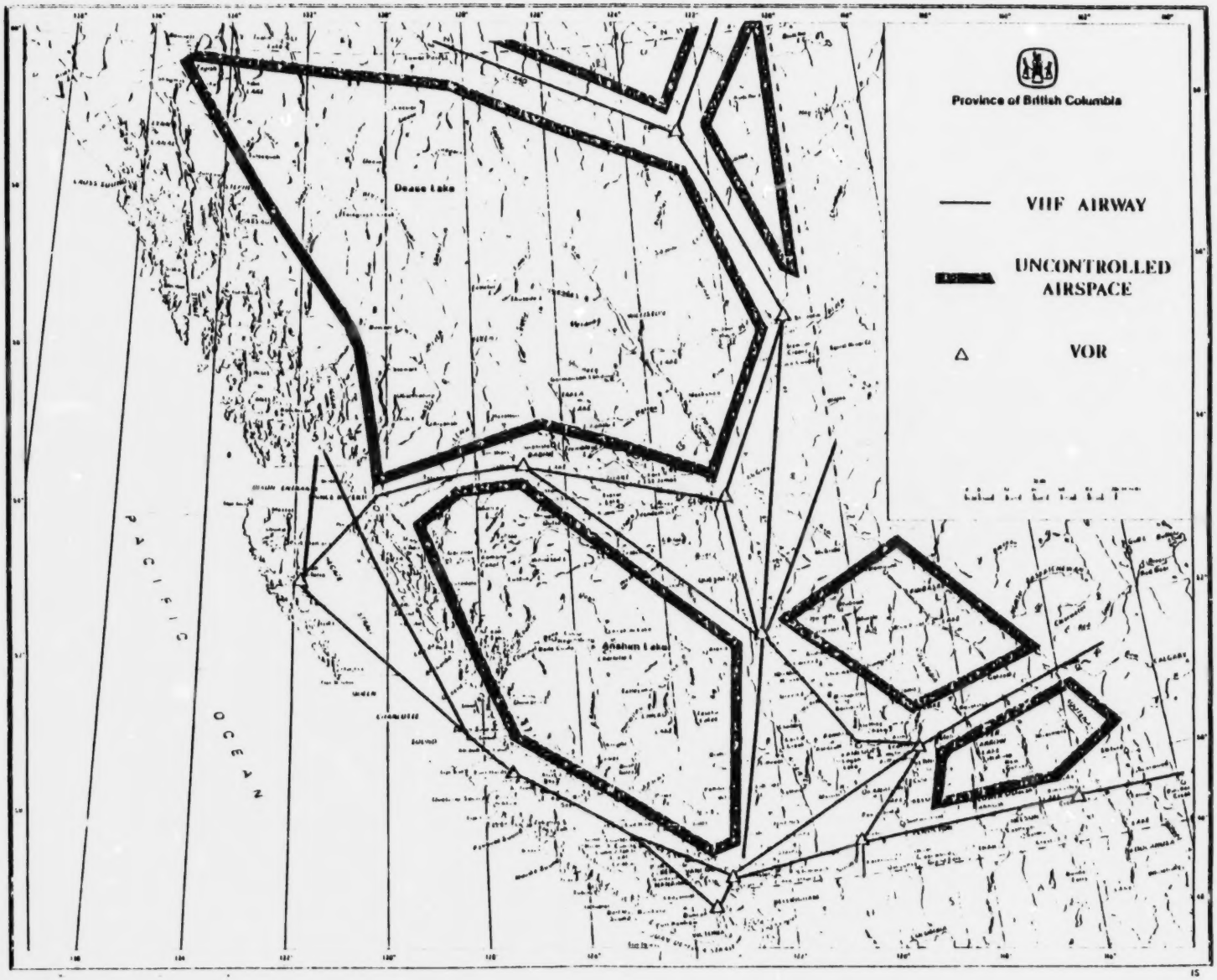
In conclusion, the need for a new policy which would permit the establishment of new air navigation facilities at strategic locations within the Province is long overdue. Provincial interest in small airports in the less travelled areas of the Province, and in support of economic and social development and a resource based economy, has been evidenced by the establishment of provincial airport funding mechanisms.

Despite the growing number of provincially funded airport facilities in B.C., it is anticipated that the existing air naviation system will continue to be a constraint on the usefulness of these facilities. Given the present federal policies for establishment of new navigation facilities, the Pacific Region (Transport Canada) will be completely unable to address the system shortcomings.

The funding of new navigation aids at strategic locations in support of these essential air transportation activities continues to be prime concern to the Province.


Province of British Columbia
VHF AIRWAY
UNCONTROLLED AIRSPACE
VOR
Dease Lake
Graham Lake
PACIFIC
OCEAN

SYPHER

APPENDIX F

CANADA POST AIR STAGE SERVICE POINTS IN B.C.

SOURCES OF DATA

Seaplane Facility Policy Study

CATA Pacific Region

AIR STAGE LOCATIONS IN B.C.

LOCATION	FLOATPLANE	FEDERAL HARBOUR
Ahousat*	NO	SCH/MOT
Big Bay	CATA	MOT
Blind Channel*	NO	MOT
Boat Basin*	NO	MOT
Dawsons Landing	NO	NO
Hartley Bay	CATA	MOT
Juskatla	Private	NO
Kincolith*	NO	MOT
Kingcome* Inlet	NO	MOT
Kitkatla	CATA	
Klemtu	CATA	SCH
Kyuquot	CATA	MOT
Mansons Landing	CATA	SCH
Masset	CATA	MOT
Minstrel Island	CATA	MOT
Oona River*	NO	SCH
Phillips Arm	NO	NO
Port Clements*	NO	SCH/MOT
Port Neville*	NO	MOT
Port Simpson	CATA	MOT
Queen Charlotte	CATA	
Sandspit	NO (water service)	
Sewell Inlet	NO	NO
Simoom Sound	CATA	NO
Squirrel Cove	NO	SCH
Stewardson Inlet	NO	NO
Stuart Island	CATA	SCH
Sullivan Bay*	Private	MOT
Surge Narrows	CATA	MOT
Tahsis	CATA	MOT
Tasu	NO	NO
Thompson Sound	NO	NO
Tlell	NO (Water Service)	

Toba	NO	NO
Ware	Private	NO
Whaletown	CATA	MOT
Zebellos		MOT

NOTE:
1. "*" INDICATES THE 10 AIR STAGE LOCATIONS WITH FEDERAL HARBOUR FACILITIES AND NO CATA FLOAT FACILITY.
2. SOURCE: CANADA POSTAL GUIDE AND PUBLIC INVENTORY INFORMATION.
3. LOCATIONS MAY NOT MEET LICENSING STANDARDS FOR WATER AIRPORTS.
4. PROXIMITY OF COMMUNITIES AND DUPLICATION OF REFERENCES MAY RESULT IN INACCURACIES.
5. A TOTAL OF 8 AIR STAGE SERVICE POINTS DO NOT HAVE FEDERAL HARBOUR FACILITIES.

APPENDIX G

THE STATUTORY OBLIGATIONS OF THE FEDERAL GOVERNMENT IN RESPECT TO AIRPORTS

1.00 THE STATUTORY OBLIGATIONS OF THE FEDERAL GOVERNMENT IN RESPECT TO AIRPORTS

1.01 The obligations of Transport Canada in respect of the provision, development and operation of airports can be determined by an examination of the BNA Act, the Aeronautics Act, government policy and precedent.

1.02 In the examination of federal responsibilities from the view point of these Acts or practices, the concept of jurisdiction occurs frequently. When reference is made to federal government "jurisdiction", what is meant is that the federal government has power to make laws in the area in question, and would be held accountable by the public if the transportation system does not work well because of the lack of appropriate statutes. It does not mean that the federal government must pass laws and/or assume responsibility for the provision and operation of means of transport, ways or terminals. The government may decide that regulation of a particular sector should be left to the free play of market forces, or it may choose to allow other levels of government or private industry to provide and operate all elements of a particular system, but the federal government remains accountable.

1.03 The BNA Act

1.04 The BNA Act as interpreted by the courts, clearly assigns the legislative jurisdiction over all aspects of aeronautics to the federal government. Nonetheless, the federal or provincial governments can extend their influence by exercising their spending powers in areas under the jurisdiction of the other level of government, provided that the legislation authorizing the expenditure does not amount to a regulatory scheme falling within that other government jurisdiction. In some provinces, the provincial government has already used its spending power to intervene in the air transportation area on its own territory. In other words, the fact that aeronautics is in the federal jurisdiction under the BNA Act does not prevent a province from exercising its spending power in the field of aeronautics.

1.05 The Aeronautics Act*

1.06 This federal law defines the responsibilities of the Minister of Transport with respect to aeronautics. "Section 3 of the Aeronautics Act lists a number of duties of the Minister of Transport. One of the pertinent duties as stated in clause (i) is: "to supervise all matters connected with Aeronautics". To supervise can hardly be said to import a duty to construct or maintain either airports or aircraft".

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* Comments in this section are extracted from a memo dated August 22, 1978 from the Departmental General Counsel - Transport, to the Director General - Airports and Construction Services, entitled "Legal powers and responsibilities of the Minister under the Aeronautics Act".

1.07 Clause (c) is the one most specific to airports: "to construct and maintain all government aerodromes and air stations, including all plant, machinery and buildings necessary for their efficient equipment and upkeep;" another duty somewhat related is set out in clause (k): "to investigate, examine and report on the operation and development of commercial air services within or partly within Canada, including the territorial sea of Canada and all waters on the landward side thereof;"

1.08 Neither one of these provisions states in precise terms that the Minister has a duty to establish an airport except clause (c) in respect of such airports as the government decided to have constructed. There is no express provision in the Act requiring the Minister to construct an airport under specific circumstances, such as according to the size of the community or scale of aviation activity. Nor is there an obligation on the federal government to continue to own, operate or maintain airports; the government could simply decide that all or some airports are no longer in the federal interest.

1.09 Clause (k) imports a duty to investigate, examine and report on the operation and development of commercial air services but there is nothing to suggest an obligation on the Minister to provide an airport where the Canadian Transport Commission has issued a licence for an air service. Even though the CTC in granting a favourable decision makes a finding of public convenience and necessity in the greater number of the decisions issued by it, there is no resulting legal obligation on the Minister of Transport to provide an airport for such service.

1.10 Further in respect of the issuance of licences by the CTC, the Act specifically provides that notwithstanding the issuance of the licence, no air carrier shall operate a commercial air service unless he holds a Certificate from the Minister certifying that the holder is adequately equipped and able to conduct a safe operation, that is, the burden of providing the proper facilities is on the holder of the licence and one of the necessary facilities for the issuance of the Certificate is an airport adequate for the proposed service.

1.11 In the case of a municipality desiring to close down its airport, there is nothing in the Act putting a resulting obligation on the Minister to take over that airport. The only way there might be an obligation on the Minister would be as a result of some lease, agreement or other document between the Minister and a particular municipality in respect of the operation of that airport. Otherwise the question of the Minister continuing the operation of a municipal airport would be a policy question rather than a legal one much the same as the granting of financial assistance to municipaiities in respect of airports is a matter of policy approved through the Estimates".

1.12 Transport Canada Policy

1.13 From the above, it is clear that there is no legal obligation for the Minister of Transport to construct, operate or maintain airports. The past involvement of Transport Canada in that area has been a matter of policy since there were no statutory requirements so to do. The involvement was, however, within federal jurisdiction over the field of aeronautics. Transport Canada decided, without any statutory obligation, to own and operate certain airports, and aerodromes which form part of the Canadian airport system. In doing so, the federal government was not obligated by the Aeronautics Act but was acting, however, within its jurisdiction over Aeronautics.

1.14 The federal government also decided to adopt policies which permitted Transport Canada to pay contributions and/or operating subsidies to municipalities for the improvement and operation of their airports (e.g. Airport Financial Assistance Policy of 1972); the federal government thus used its spending power to enter this area of air transportation.

1.15 Notwithstanding the lack of statutory obligation to construct, operate or maintain airports, Transport Canada has undertaken the responsibility in many cases. This ongoing program has been developed and approved by Treasury Board and subsequently by Parliament (by approval of estimates) for three to four decades.

1.16 Canadian Transport Commission Policy

1.17 The CTC regulations for air carriers define class 1 and class 2 services as follows:

a. Class 1: Scheduled commercial air service, being a service that is operated wholly within Canada and that is required to provide public transportation of persons, goods or mail by aircraft, serving points in accordance with a service schedule at a toll per unit of traffic;

b. Class 2: Regular Specific Point commercial air service, being a service that is operated wholly within Canada and that is required to provide, to the extent that facilities are available, public transportation of persons, goods or mail by aircraft, serving points in accordance with a service pattern at a toll per unit of traffic.

1.18 While it would appear that there might be a difference in the emphasis on provision of airport facilities between a class 1 service and a class 2 service, there is no obligation in law on the Department to provide facilities for either class 1 or class 2 services. The CTC, in issuing licences does not believe

there is an obligation on the Department or other airport owners/operators to provide facilities, but it will continue to issue licences where facilities are not available in the belief that service is in the public interest and that facilities will ultimately be provided.

1.19 Precedent

1.20 Even though air transportation is a matter of federal jurisdiction, various provinces, for a great number of reasons have already become involved with some areas related to aeronautics on their territory, by using their own spending power (see Appendix B). Therefore, it can be said that some provinces have already created a precedent, for involvement in being involved, in varying degrees, in the construction, operation and maintenance of airports.

1.21 Conclusion

1.22 From the above, it can be concluded that Transport Canada has no statutory obligations for the provision, development or operation of airports. That it has done so in the past to the extent that it now operates 16% of the airports with 89% of the passenger traffic and financially assists 34 others, has been a matter of policy.

POOR

QUALITY

ORIGINAL